# The Challenges of Renewable Energy Resource Development: The Case of Gilgel Gibe III Hydropower Project in Ethiopia

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# Abstract

Gilgel Gibe III hydropower project is one of the large-scale projects presently under construction in Ethiopia. The project has been surrounded by controversies and strong oppositions. This study sought to examine these controversial issues, the causes and consequences of these challenges. It also highlights the impact of the project on livelihoods in local communities and on the environment along the 150 km long stretch of the river which will be inundated as a result of the dam. Local people's perceptions within the project area were also explored. The study focused on Addisu Bodere Peasant Association (PA) which is one of the PAs located in the immediate vicinity of the dam site. The study employs interviews, focus group discussion, and informal conversations, as well as secondary data sources.

It was found that participation of stakeholders particularly during the process of the environmental and social impact assessments and the coordination between the project owner and pertinent government institutions was limited. Its inconsistency with regulations set by the World Bank, African Development Bank, European Investment Bank made these financiers annul their financial support for Gibe III dam construction. This would affect the completion period of the project. Although the project owner claim that the planning and Environmental and Social Impact Assessment(ESIA) process was participatory some members of the communities affected by the project claim that they were not included in the consultation process and were denied their right to receive compensation. Between the people inhabiting on both sides of the river there is regular socioeconomic relationship crossing the river at some points. This relationship will be interrupted by the reservoir. It will inundate wildlife habitats and disturb their food-chain system; push predators towards settlement areas endangering livestock and humans.

Moreover, the study shows that there are public concerns as some members affected by the project were not included in the compensation package, leading to dissatisfaction amongst local farmers with the local government and the project owner. On the other

hand, the general perception of the local communities on the new project was generally positive expecting that this development will supply them electric light, facilitate school and health services, and establish parallel and radial road networks on both sides of the river and have fair market prices to farm products. Strengthening these positive perceptions and expectations depends on the development plan and transparency of decision makers involving a greater participation of local communities and pertinent development partners.

# List of abbreviations and Acronyms

| | |
|---|---|
| AfDB, | African Development Bank |
| EEPCO | Ethiopian Electric Power Corporation |
| EIB | European Investment Bank |
| EPA | Environmental Protection Authority |
| EMU | Environmental Monitoring Unit |
| ESIA | Environmental and Social Impact Assessment |
| HPP | Hydropower Project |
| ICBC | International Commercial Bank of China |
| ICS | Inter-Connected System |
| IE | International Energy Agency |
| IHA | International Hydropower Association |
| MME | Ministry of Mining and Energy |
| MWRD | Ministry of Water Resources Development |
| NBCBN | Nile Basin Capacity Building Network |
| NGOs | Non-Governmental Organisations |
| PA | Peasant Associations |
| SCS | Self-Contained System |
| UNESCO | United Nations Education, Scientific and Cultural Organisation |
| USAID | United States Agency for International Development |
| WCD | World Commission for Dams |
| WB | World Bank |

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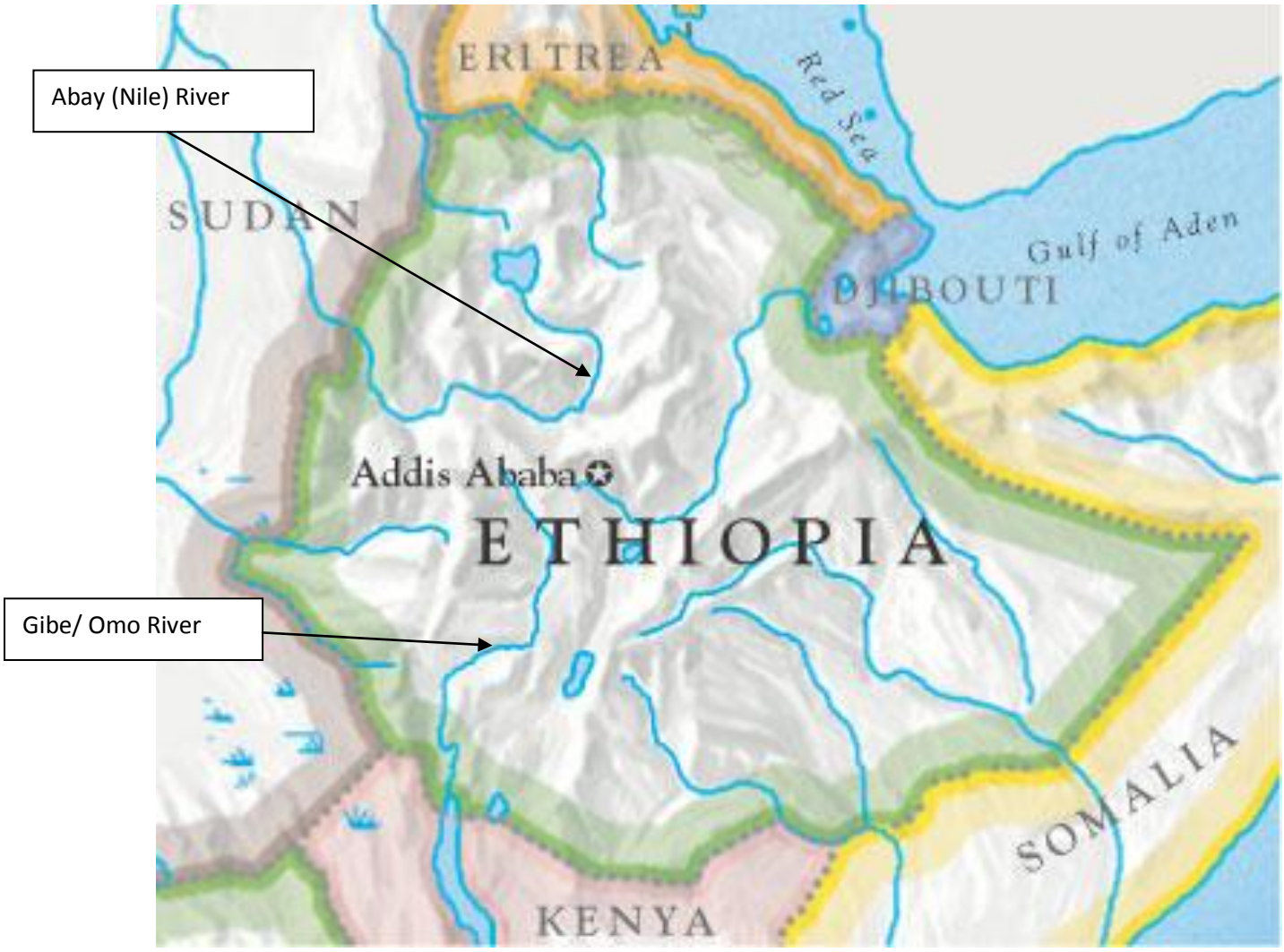



Map 1. River basins of Ethiopia, source: http://www.google.no/imgres

Photo 1. Partial view of Gibe River, taken by the author

# 1 General Introduction

In the technologically advanced world of the 21st century, the development imperative of renewable energy resources and hydroelectric power in particular, in developing countries is attributed to the role it plays in economic advancement and in everyday activities: production, consumption, communication, health, education, etc. Although electric energy is one of the major propellers of economic growth, one of the biggest challenges facing both developed and developing countries currently is the guarantee of a sufficient supply of environmentally friendly energy (El Bassam 2004).

Renewable energy resources in general and hydropower in particular have been characterized as benign sources of electrical energy that can have a positive contribution for climate change mitigation (IHA 2003). Research on replenishing electrical energy resources has established an empirical ground to argue why renewable resources should constitute an essential part of the electric energy system. Major reasons include that they are clean alternatives to greenhouse gas producing fossil fuels; they can supply the demand from rapid population increases in the developing countries, the rise in the price of fossil fuels, and for the simple fact that future depletion of fossil fuel reserves makes renewable resources possible options for developing economies (El Bassam 2004, Sternberg 2007). These key justifications may provide decision makers in developing countries a ground to consider renewable energy resources as an alternative source of energy or at least as part of the energy mix. And quite a large number of developing countries, of which Ethiopia is not an exception, have framed an energy policy that could facilitate the exploitation of locally available renewable electric energy sources such as hydropower resources. Thus, the question of why many developing countries and particularly Ethiopia focus on exploiting locally available renewable sources of energy such as hydropower can be linked to empirically established rationale and frequently debated challenges in major development and political discourses.

Hydropower has a recorded history of electric production providing substantial energy services in many parts of the world such as the U.S.A., China, Canada, and Norway (Gilpin 1995). When one looks at different national policy documents on hydropower

development projects, the following are mentioned as main reasons to develop this sector:

Hydro power is a renewable, economic, non-polluting and an environmentally benign source of energy. Hydro power stations help in improving the reliability of the power system. Some hydroelectric projects have long life spans extending over 50 years and overall help in conserving scarce fossil fuels (IHA 2003).

These notions are epistemological features most of which are inherent characteristics of hydropower energy resources (Ch. 2). However, rarely mentioned in these policy documents are the inherent characteristics reflected on the other side of the coin: the social and environmental costs of hydropower development projects. These dimensions have not been addressed sufficiently as parts of hydropower project development processes and it is argued that these two dimensions are the major sources of controversies of hydropower development projects in developing countries (Briscoe 1999).

The perception of large dams as a development imperative is challenged by a paradigmatic shift in water resources development from a supply-based and control-based approach to increased concern for environmental and ecological impacts and the economic and social costs of the construction of large dams (Allan 2003, Gleik 2000, in Alhassan 2009:149). Consequently the negative impacts of large dams on both society and nature have generated the perception of large dams as failed development technologies (Alhassan 2009).

The critics of large dams is ‘based on the concerns about how they dismember rivers, dislocate entire communities, fracture social cohesion, and damage the dignity and mental psyche of those affected, leading to untold and irreparable hardships, yet without any corresponding benefits’(Gleik 1998, in Alhassan 2009:149). As a result some people who resettled due to the construction of dams feel short-changed (ibid). And if they at all are compensated or relocated, the relocatees are left usually without post-compensation management.

The disapproval of large dams as a failed technology due to their social and environmental costs has coincided with a surge in non-governmental environmental activism. The strong opposition against large-scale hydropower dams in contemporary Africa has then hinged the support of such large infrastructure developments in the continent, leading to a significant decline in the development of large dams in the late 1980s (Bergeret et al 2003, in Alhassan 2009). But criticism of large dam projects in Africa such as Ethiopia, Ghana, and Uganda has sometimes been perceived as a deliberate attempt to subvert the developmental aspirations of these developing countries, thereby denying them the infrastructure needed for national development (Alhassan 2009). For example the strong opposition that emerged against the Bujagali dam in Uganda, the Bui dam in Ghana, and the Gibe III dam in Ethiopia among others, has been perceived as subversive by the respective countries' decision makers. In an interview with BBC journalists in March 2009, the general manager of Ethiopian Electric Power Corporation (EEPCO) Mihretu Debebe pointed out: "*Africa is in the dark. Give us the choice. Should we stay in darkness? Should we avoid all this development?*[1]".

The Government of Ethiopia envisions the Gilgel- Gibe Hydropower Project as one of the development projects to meet the country's rising demand for energy. The project will have the capacity to generate 1870MW of electricity. The dam site is located in the Southern part of the country 470 km. south of the capital city, Addis Ababa along the upper Omo river basin. In the upper part of the river, a 150 km long, 610 meter wide and 240 meters high dam is under construction. The banks of the river are mostly used as grazing land, sources of construction materials and firewood, as well as an important route of exchange between the communities living on both sides of the river.

The controversy over large-scale dams such as the Gilgel Gibe III hydropower project is complex, and touches on the wider contemporary debate in Africa over renewable hydroelectric energy supply for sustainable development. In Ethiopia's hydropower

[1] http://news.bbc.co.uk/2/hi/africa/7959444.stm. 'The dam that divides Ethiopians'. 26 March 2009. (12.10.2010)

development history, this large-scale project is the most contested and has been regarded as the most atrocious project of its kind. International NGOs such as the International Rivers Network, the Brothers of Lake Turkana and Survival International are among the NGOs that established aggressive opposition against the construction of the Gibe III hydropower project. These organizations have repeatedly appealed to international financial organizations to halt financing the project as it does not comply with the internationally set principles of hydropower dam construction. According to these claims, the project owner-EEPCO did not follow the required procedures while conducting an environmental and social impact assessment (Survival International 2009).

The critique of the Africa Resources Working Group (ARWG), a body comprised of experts from the U.S.A., Europe and East Africa researching on hydroelectric dams and policy in the region indicates that the ESIA study is based on 'a series of faulty premises, is subject to pervasive omissions, distortion and obfuscation' and relies upon data selected for their consistence with the predetermined objective of validating the completion of the Gibe III hydro dam (ARWG 2009, in Survival International 2009:5). The design and content of the entire environmental and social investigation is demonstrably crafted to support this predetermined conclusion (ibid).

Contrary to this critique, proponents of the Gibe III hydroelectric dam argue that the case of Gibe III dam is quite different from other dams in different parts of the world constructed in relatively flat land. As it lies within a massive gorge, building this dam does not bring significant damage to the environment (Tewolde 2010). In summary, the Gibe III hydropower project located along the massive gorge some 300 km southwest of the capital city, Addis Ababa, has been subject to complex controversies and challenges. A number of actors were involved, some for the project, while others were against it. The opponents on the one hand have put strong pressure on international financing organizations such as the World Bank, EIB, and AfDB not to finance the project as it did not fulfill the requirements stipulated by these organizations (Ch.2). The opposition or support of the Gibe III dam in Ethiopia, like similar development projects in

developing countries arrives at a broader debate about the very meaning, purpose, and pathways for achieving development (Alhassan 2009).

As a renewable and locally available amenity, proponents assume that this project will have a positive contribution to national economic growth with the added benefit of mitigating climate change. How this project impacted the local environment and the local peoples will be part of the main discussion of this thesis. Actors in the Gibe III project with multispectral interests include: the project owner-EEPCO, the project financiers, NGOs, local peoples affected by the project. Based on the participation of these actors, it is imperative to examine their respective levels of involvement in the project planning and implementation process and to explore how the absence of one or more group challenges the progress of the project construction. With this analysis of Gibe III's case this thesis highlights the perceptions of local peoples with regard to how the project affects their livelihoods, socio-economic condition and social relations.

## 1.1 The problems and research questions

This thesis aims to examine the main challenges of hydropower development in Ethiopia with particular focus on the case of the Gilgel Gibe-III hydropower project. Like many other large-scale hydropower projects, the Gibe III project involves a number of actors namely the project owner,-EEPCO, the financing organizations, environmental NGOs and local peoples affected by the project in general.

These actors have different perceptions, values, purposes and expectations and thus differing roles regarding project planning and implementation. The government of Ethiopia envisages the project from the point of view of development imperatives with ambitious expectation of high electric production for extensive economic development. The international NGOs view the project as the most destructive and failed project in Africa for its devastating impact on biodiversity, justifying their claim that the project should not receive any financial support from international financing agencies (Pottinger 2009). Finally, local people view the project with a blend of fears and hopes. Their fear stems from the impacts the dam will have on their livelihoods, social relations, and the impoundment of the river banks on which large groups are dependent for alternative

means of income including grazing land for semi-pastoralist tribes. The strong pressure from international NGOs on financing agencies leading to the subsequent halting of financial support has frustrated the project owner who labels these environmental groups as organizations with a 'subversive mission' against the economic wellbeing of the country.

The people living along the 150 km-long reservoir that will be created by the Gibe III hydroelectric project rely on small-scale farming, semi-pastoralism, where the river bank serves as an important livestock browsing area, a source of fuelwood and construction materials, and a multitude of other wild resources, including honey gums, and traditional herbal medicines. The project has a significant effect on local socio-economic conditions and the environment. Thus, this thesis will examine how this hydroelectric development project affects the local environment and peoples' socio-economic condition and whether the project planning competently addresses these issues. From the various points of view mentioned here, it is also possible to draw conclusions about each actor's impact on project implementation.

It is plausible that big dams like Gilgel-Gibe III change settlement patterns of the population, the land use and vegetation cover, and the local biodiversity. So how do the local people around the project area understand the project from the point of view of their livelihoods and their social and local environment? This question will also be examined as part of the main theme of this thesis.

## 1.2 Research Questions

Since there are paradigmatic and policy shifts with regard to approaches to hydropower development in developing countries, especially in Africa, this thesis will assume that hydropower project planning and implementation should be participative and must have multidisciplinary attributes. Based on this, this thesis will be guided by the following research questions:

- How participative was project planning and implementation of the Gibe III hydropower project?

- To what extent would the presence or absence of one or more actors on the scene affect project implementation as scheduled by the project owner? And what general implications does this have on the relations between the project owner, the NGOs and the financial agencies?

- What particular impacts will the project have on the livelihoods of the local people and on local biodiversity along the 150 km reservoir created by the dam and how do the project owners address these issues?

- How do the local people living along the project area perceive the project in terms of its impacts on their livelihoods and their expectations from the project?

## 1.3 The rationale for choice of topic and case study

My interest on writing a thesis on the Gibe III hydroelectric project stems from two principal motivations. Firstly, and simply, personal interest in Ethiopia, including my curiosity in exploring the interface between environment and development in the country provide a basic foundation for this inquiry. But secondly, and most importantly, my interest was sparked after viewing documentary report by the BBC World Service on the Gibe III project and the controversies surrounding it, which I will discuss further below[2].

There is a traditional Ethiopian proverb which states: **ያባይ ልጅ ውኃ ጠማው** *yabay ləğğ wəḫa ṭämmaw*- literally; 'thirsty child of the Nile'. 'Thirsty' here refers not only to yearning for a drink of water to soothe a dry throat, but also hints a greater lack of access to water resources in general, whether clean drinking water or water that would drive a turbine for energy production. In this way, this phrase captures the experience of the paradoxes between available water resources and lack of accesses that could be reaped from these resources.

[2] http://news.bbc.co.uk/2/hi/africa/7959444.stm. 'The dam that divides Ethiopians' March 2009 (12.10.2010)

The implications of Ethiopia as the 'water tower of east Africa'- an upstream state with 12 major rivers, 8 of which flow perennially into other countries- is of central importance to the study of hydropower development in the country. Studies show that these rivers have a potential to produce well over 45,000 MW of electricity (EEPCO 2009). Less than 2 percent of this potential is exploited. The service is centered on urban and industrial areas leaving 85 percent of the rural population without modern electric services. The traditional proverb I mentioned is further illustrated by Ethiopia's lack of hydroelectric energy exploited despite having abundant water resources. The discrepancy between the country's available water resources and the marginal level of hydroelectric production is thus major motivation for deeper study.

The BBC documentary called "The dam that divides Ethiopians[3]" touches on the controversial role the Gibe III hydropower project plays in this resource dilemma. Among the individuals interviewed were Richard Leaky, an ecologist, the prime Minister of Ethiopia, the General Manager of Ethiopian Electric Power Corporation, an environmental scientist from Ethiopia, and local people near Lake Turkana- consisting of -tribes living at the tail of the Omo River. The Ethiopian side of the debate strongly supports the Gibe III project, citing development imperatives of the project, The Kenyan side of the debate has the staunchest critics, namely Dr. Leaky who argued that the study was produced with one aim in mind, and furthermore that 'the project impact assessment is ….fatally flawed'. The local people furthermore were afraid that they would lose their livelihoods if the water were dammed in the upper part of the river. It is this polarized perspectives that motivated me to further explore the case of Gibe III hydropower project and investigate the controversies surrounding the project.

Another point of importance regarding hydropower projects is their geographic specificity. In other words, from case to case or dam to dam, the degrees of socio-economic and environmental impacts vary remarkably, so each project requires consideration of a unique constellation of interacting factors. For example the number of people displaced by the Greater Aswan dam of Egypt, three Gorges of China, the

[3] http://news.bbc.co.uk/2/hi/africa/7959444.stm (12.10.2010)

Akosombo of Ghana, and the Gibe III of Ethiopia are quite different in number, in geographical locations. Furthermore, the displaced hold very different perceptions, experiences and expectations of the respective projects. In sum, each setting deserves a different local-specific approach to study and understand the interplay of pertinent issues. This study of Gibe III hydroelectric project has been approached with geographical specificity in mind.

Quite a large number of studies on hydropower projects have contributed to improve the knowledge base of the challenges and the implications of hydropower development projects (Gutman 1994, WCD 2000). Some decision makers might have learned from these studies and planed their projects cautiously not to repeat the same mistakes as before, while many others have ignored the implications of large-scale hydropower projects especially on local communities and biodiversity. More specifically, in Ethiopia where there has been little attention and knowledge of in-depth project impacts, it is believed that this study will contribute to an improved knowledge-base for the use of decision makers and benefit of the local people.

## 1.4 The research method

In this study, the choice of qualitative methodology as a main approach to explore the controversial issues pertinent to the Gibe III hydropower project have been utilized, since these are the most appropriate to examine the research questions.

I will examine the controversies surrounding hydropower projects with particular reference to the Gibe III hydropower project located in south-western Ethiopia. The study aims to examine the level of participation of different actors, the impact of the degree of participation of these actors on the project implementation, the influences the project has on the local people and their livelihoods as well as their perceptions, experiences and expectations for the project and finally impacts on the local environment. The study area was purposively selected as a case study with the intention of studying the Gibe III project in the context of the local people to convey the

controversies to decision makers, so these local complexities can be taken into account in due process of the project development.

The data for this study were generated from both primary and secondary sources. The techniques employed were in-depth interviews with experts from the project office, the Environmental Protection Authority (EPA), experts at the project site, and the local people adjacent to the dam area. A focus group discussion was also conducted with farmers from Addisu Bodere Peasant Association that were affected by the project. Informal discussions were also important parts of the fieldwork.

The study also made use of secondary data sources obtained from different institutions. Various publications related to environment, hydropower project management plans, and the ESIA of Gibe III project, were used. The sources of data also include articles, journals, internet materials and reports about the project. These sources were collected mainly from the EPA, EEPCO- project office and the Gibe III project site, Addis Ababa University, the Central Statistics Authority, the Ministry of Water Resource Development (MWRD), and information was also retrieved from various NGO websites.

## 1.5 Scope of the study

Large-scale hydropower development for producing electricity as a major source of energy is a complex process involving a number of actors in the planning and implementation phases of the project. These steps include: planning and construction and production, transmission and distribution of electricity. Gibe III is in the construction phase. During this stage the project affected communities are those living anywhere from right above the dam site to 150 km upstream where the artificial lake will be created. This study is thus limited in scope to the construction phase accordingly. Studying the overall impact of the project on the environment and the people living below the dam is premature as there is no practical impact prior to completion and commissioning of the project. Furthermore, the array of issues relating to the project is difficult to cover all within a short period of time and in limited geographical space.

Therefore, the study is not a comprehensive assessment of the impacts of large-scale hydropower development nor would it be a sensible objective. Studying the overall impact of the project would imply consideration of the entire 700 km of the River Omo below the dam to its mouth in Lake Turkana, which would require significant time and resources. Hence focus here, as stated above is limited to one phase of the project development, and to impacts thereof in the immediate vicinity.

## 1.6 Thesis Outline

The present chapter has introduced the general background of the study. To summarize, it has framed the main problem this thesis aims to research: the research questions, the rationale for the topic and the case study of Gibe III hydropower project, as well as the methodological approach employed in the research. Chapter two presents the literature review reflecting on renewable energy resources in general and hydropower resource as part of renewables in particular. This chapter furthermore highlights the involvement of actors with different views on the development of large-scale hydropower projects in developing countries and how controversies and subsequent challenges manifest. The model depicted in this chapter (fig. 2.1) is assumed as an ideal model to employ in the analysis to shed light on how the absence of one or more actors affects the project development process. It will also help to see that the participation of these actors is informed by their perceptions of the hydropower project: from the perspectives of development imperatives (governments), environmental conservation (international NGOs), and local livelihoods (the local communities). Chapter three describes hydropower development in Ethiopia in general and the Gibe III project in particular. It presents a historical overview, and then potential development versus the present status of the sector. An overview of the Gilgel Gibe-III hydropower project study area is given, including the climate, physiographic features, and socio-economic conditions of the surrounding communities. Chapter four deals with the methodological approach employed in the study and the fifth and sixth chapters involve the main discussions presenting the findings of the research. In chapter five the Gibe III project is examined in relation to the involvement of actors in the project planning and implementation

processes and the challenges therein. in chapter six I discuss the relationship between hydropower, environment and the local community. This section highlights the impact of the projects development on the local environment and livelihoods of the local community. It gives an idea of how the community's strong attachment to the project area would be compromised due to the transformation of the river banks from a terrestrial landscapes into an artificial lake. Finally, chapter seven presents the conclusion and some recommendations based on the discussions in chapters five and six.

# CH. 2 Literature Review

## 2.1 Renewable Energy Resources

Energy or more specifically electric energy generation is a general idea indicating the production and use of energy either from non-renewable or renewable sources or from a combination of them. Most predominant sources of nonrenewable energy include coal and crude oil (Mega 2005). Renewables include hydropower, wind, solar, and tidal energy, among others. The recent decades have marked an evolution in research and policy interest focusing on environmentally and socially compatible energy resources, of which hydropower is one of the most widely utilized in many parts of the world (Fery et al 2002).

In this chapter, I will begin with the general rationale for the gradual shift in research and policy attention towards the production and use of renewable sources of energy. Then as the central theme of the thesis, I will discuss the case of hydropower and the salient challenges emerging around this sector, paying specific attention to two opposing camps: embrace vs. opposition of the development of large-scale hydropower projects in developing countries. This will highlight particularly why large-scale hydropower projects in developing countries become a controversial issue subject to a number of challenges. Stemming from this, one may argue that a number of challenges big dam projects face are not intrinsic, but rather the result of the controversies of opposing viewpoints during the development process. At the center of these debates are the local environment and communities, which are in closest contact with spatial location of hydropower production, and thus it impacts them positive and negative.

The major challenges surrounding hydropower projects in developing countries that are addressed in this section include: the financing of dams and debates around why or why they should not receive international financing; the issue of public participation in project planning and implementation, the assessment of environmental and social impacts of the hydropower sector, and the challenges related with legal frameworks and the institutional roles in Ethiopia's hydropower energy policy.

The discussion on these issues will be included in the figure 2.1 mentioned in this chapter as 'actor cooperation in hydropower project development'. In general, it can be said that the points discussed in this chapter will give an idea that hydropower project development in developing countries have an international and national characteristics, and the sector needs a multidisciplinary approaches involving actors of varying professional background and interests. It may also help to indicate that the absence of one or more participant group may affect the process of planning and implementation of hydropower development projects.

### 2.1.1 Why Renewable Energy?

I begin this section by asking 'why renewable?' to point out that the rationale for the emerging research and policy interest in developing renewable energy has an empirical ground, and to see how decision makers employ this science as a policy tool at local levels, particularly in the case of hydropower. This question also serves, to show resulting controversies of this logic and how they challenge the efficacy of hydropower development projects in developing countries like Ethiopia.

Environmental 'friendly' energy is associated with energy obtained from natural resources which are continuously available. Hence such energy is described as 'renewable'. The major renewable energy sources include solar, wind, hydropower, and biomass fuels (Mega 2005). These resources furthermore are locally available amenities.

Some studies show that two billion people in developing countries live without access to electricity (Strenberg 2008, Goldemberg, et al, 2010). Thus, one may pose the question: what would our environment look like if these people had full access to fossil fuel driven energy systems? Although it is difficult to confidently answer such prognostic question, empirical evidence shows that the use of fossil fuels as a source of energy aggravates the problem of global climate change (Strenberg 2008).

Moreover, there is established evidence ascertaining that excess carbon dioxide and other environmentally dangerous emissions result from the utilization of coal and fossil

fuels for economic growth (Goldemberg, et al, 2010). The 'effect' is an increase in global mean temperature which has severe consequences for life on Earth. Thus there is a resulting need for research and policy to reduce the effect. To reduce the effect of global warming, many scientists propose that policies at various scales have to focus on energy production which is compatible with environmental wellbeing (Mega 2005).

Moreover, geological science reveals that the source of carbon and hydrocarbons are ultimately finite (Kelly 2007, Twidel et al. 2005). The location and the quantity of such stocks depend on the latest surveys and scenarios (ibid).Today's bountiful boreholes will be mere relics and ghost spatial locations within few decades. In this context, fossil fuel reserves are limited and so the present patterns of energy consumption and growth are not sustainable in the long term (Twidel, et al.2005). Similar to Twidel's view, Edinger (2000) suggests that the classical assumption that natural resources are readily available whenever needed with an open-ended possibility to exploit them and generate energy is more rhetoric than reality.

Even if the use of these resources by default were not polluting, their finite nature would still not save them from exploitation, but the emissions from combustion of fossil fuel increasingly determine the fundamental limitations of their use indefinitely in the future. Increasing concentration of $CO_2$ in the atmosphere as a product of combustion affects the ecology of the Earth (Goldemberg, et al, 2010). The concern that is voiced over is not confined only to air pollution of local or scenic areas, which is a geographically bounded cultural landscape. It is about the change in quantity of the atmospheric carbon dioxide concentration, its spatial coverage and the resultant qualitative change of the global climate system. Carbon dioxide released from industries, automobiles, and services in Berlin, London, Beijing, etc., occupies atmospheric space of many folds to their geographical sizes. Point sources of pollution thus affect a global system.

This seems to be the rationale behind why many scientists recommend that policy makers look into alternative energy resources including solar, wind, hydropower, geothermal, etc (Twidel et al. 2005). Some of these resources are not new to science and have been driving the economic development of many countries for a long time. For

example, hydropower has been an important source of electricity for decades in the US, Norway, Canada, and many other developed countries (Gilpin 1995).

The growing demand for energy entails a growing exploitation of resources for energy production. But not all energy resources are infinite nor are they non-polluting, thus renewable sources become attractive alternatives for sustainable electric energy production. The grounds for the importance of investment in renewable resources are based on three major drawbacks that characterize fossil fuels: they are finite, their combustion releases of carbon dioxide and other trace emissions into the atmosphere and these emissions have detrimental impacts on ecological sustainability (Twidel et al. 2005). Twidel et al (2005) underscore the necessity of expanding renewable energy supplies and using energy more efficiently. By the same token, Goldemberg et al. (1995, in Najam 2005) argue that reliable, affordable and less polluting energy sources are widely important and even indispensable components of sustainable development. According to Edinger et al.,(2000:25) 'renewable energies are the only power sources to serve energy demand of a worldwide growing and developing population without causing irreversible damage to the world climate'. Edinger's view is grounded on three main conditions: the world population is growing rapidly, there is a growing demand for economic development, and these demands can be met without damaging the environment by using renewable energy sources. Edinger's views are suggestive of the importance of innovative research and policy initiatives aimed at exploiting potential renewable resources in a sustainable manner.

Quite often, hydropower, solar, wind and geothermal energy are locally available sources which may contribute to cover the needs for various energy services (Ringel 2004). More specifically in Africa where these energy sources are abundant, it will be crucial to reorient energy policies to exploit these rich resources sustainably. Since 'renewable energy systems involve a range of scales of technology, using a diverse of locally available indigenous sources, they are likely to offer a more reliable basis for secure energy supplies than systems that rely on imported fuels'(Elliot 2003:177).

As a main challenge, however, many technologies to exploit renewable energy sources especially in developing countries are technically immature (Ringel 2004). Application of and activities relating to such technologies in developing countries like Ethiopia are still scattered and modest with a number of stumbling blocks inhibiting the exploitation of renewable resources. The initial costs to develop hydropower, wind energy, solar and geothermal are particularly expensive and force decision makers to give priority based on the construction costs. For example, Ethiopia's Ashegoda wind farm in the northern part of the country is under construction with a price tag of 210 million Euros to produce 120 MW of electric power. On the other hand Gilgel Gibe-III hydropower project will cost 1.48 billion Euros to produce 1870 MW of electricity. This example illustrates the relative economic advantage of hydropower versus wind energy development. Hydropower tends to be one of the main energy sources given priority in energy development planning of many African countries, including Ethiopia, Uganda, and Ghana among others (Karekezi, et al 2003). In addition to higher amount of energy production from large-scale hydroelectric projects, large reservoirs can be used for different purposes including irrigation, fish production and tourism.

## 2.2 Large-scale Hydropower development:

Likely, the greatest challenge faced by humanity in the 21st century is the quest to promote socio-economic development whilst halting environmental degradation (IHA 2003). It is also true that energy is an essential element of human life and is at the center of any discussion about social, economic and environmental development. I have shown how, taking the issue of climate change to the fore of development debate, in developing countries like Ethiopia, reinforces a faith in locally available renewable energy resources as a means of economic development. As presented thus far, hydropower in particular has become the major candidate resource that many countries in Africa have planned to develop as a source of electricity for socio-economic development (Sternberg 2007). The discussion of the main challenges and controversies surrounding hydropower projects in developing countries will also be expanded. As defined by Twidel(2007:237), ''hydropower is usually restricted to the generation of

shaft power from falling water, which then is used for direct mechanical purposes, or more frequently, for generating electricity'' (Twidel, et al 2005:237). In this process, water is first diverted from a river course, or is impounded by dams, and is then steered through a penstock to a turbine, which rotates from the force of the falling water (Kosnik 2008). Generators are connected to the turbines that rotate and turn the mechanical energy into electrical energy, which is then conducted along transmission lines to the ultimate point of use (ibid). In effect, therefore, the process carries neither physical nor chemical changes. It is a water-in and water-out process changing the natural flow velocity and thereby transforming kinetic energy into electrical energy, which is ultimately transmitted to demand centers through transmitters and grid connections.

Hydropower became a vital source of electric energy as a consequence of a series of technological innovations in the late 19$^{th}$ century (Sternberg 2008). Through time, while the innovative capacity and the technical viability of hydroelectric power was established, the rapidly increasing demand for electricity turned hydropower in many countries into the 'energy bridge' to development and modernization (Sternberg 2008). The progress was rapid. For example, by the 1900s hydropower accounted for more than 40% of total electricity supply of the U.S.A., and by the 1950s it was one of the most important electric energy sources in the United Sates. Europe and North America have developed 75% and 69% of their technical and economic potential respectively (IHA 2003, Kosnick 2008).

However, after the 1970s, further construction of hydroelectric projects has declined in many parts of the world (ibid). Many scholars attribute various causes for the decline. For example, Twidel et al. (2005) contends that most of the best sites in industrialized countries had already been exploited between the 1940s and 1960s, and so the rate of exploitation and total generating capacity of hydropower in these countries diminished (Twidel et al 2005). Not only that, as Smil (1994) has noted, the post-WWII boom of oil industry at a relatively lower cost of investment as well as its high commercial turnover drove hydropower to be of less area of investment. And still by and large, the rise of

public awareness of environmental issues in the 1970s put further development of hydropower into question mark (Sternberg 2008). As noted by Sternberg, public awareness of the negative environmental and socio-economic impacts of large hydropower plants invited political and social disfavor for hydroelectric installations. In academia which has discussed the importance of renewable energy sources in the future energy matrix particularly, large scale hydropower development is downgraded as a major energy source due to its negative impacts on local biodiversity and the local community (e.g. Edinger 2000, Elliott 2005, Mega 2003, and Smil 2005). Yet, a number of large-scale hydroelectric dams are under construction in many parts of the developing countries. The Bujagali hydroelectric dam in Uganda (Heien 2007), the Xingu river dam in Brazil (Fearnside 2005), Bui dam in Ghana (Al Hassan 2009), and six large-scale hydroelectric dams in Ethiopia are some examples.

### 2.2.1 Hydropower: a controversial subject

Hydropower projects have undergone extensive studies and analyses by professionals, policy makers and many other interest groups to understand the pros and cons of present and future dam constructions to produce electricity. Some reach positive conclusions after studying the legacy of hydropower projects in different parts of the world, while others strongly criticize the construction of large-scale power dams in developing countries after studying the negative environmental impacts of hydropower projects. In this section, I will discuss the views of the proponents and opponents of hydropower projects in detail.

Both sides argue that their views are in favor of the local environment and the people around the hydropower projects. In the final analysis, these views provide insight into how support or opposition of dam construction is formed, and what challenges on the ground hinder the cultivation of a unanimous support.

Proponents of hydropower development argue that hydropower has a huge potential to ‘improve economic viability, preserve ecosystems, and enhance social justice’ (IHA 2003:71). This model is undermined when projects are unskillfully planned, built and

operated diminishing the project's potential in economic, environmental and social development (ibid).

While it shoulders 20% of the world electric supply, accounting for 88% of all renewable energy production, and contributing highest electricity supply in many countries, such as Norway, one can strongly underscore that hydropower's contribution to national and global economic, environmental and social development is remarkable (IHA 2003). Furthermore, the 20% contribution of hydroelectric energy production today should not be overlooked. It implies that the amount of fossil fuel burning for electricity is avoided by roughly 20%, saving the environment from what would otherwise result in increased GHG emissions. Economically speaking too, energy is the center of economic development. To drive their economy, developing countries that have no fossil fuels import this resource at high prices while many of them have a high potential of hydroelectric energy. At present thus, there is a tendency for nations poor in fossil fuels to use their potential hydroelectric resource as an import substitution for thermal electric energy.

Hydropower has a long history as a source of electricity. It began to provide commercial electricity needs since the early 19$^{th}$ century in the U.S.A. (Sternberg 2008). This fact supported hydropower proponents' argument that hydropower endows a high efficiency and long temporality of services with resultant economic turnovers. Cost-benefit analysts set the service duration to be between 50 to 100 years or more, despite the expensive initial construction costs(IHA 2003, Sternberg 2008), which can be balanced by revenues from its long term services, an economic merits of crucial importance for policy makers and researchers. Where water resources for hydropower are available and efficiently exploited, there is a reduction in pressure on the balance of payments which would otherwise be invested to import coal and oil for electricity (IHA 2003). Additionally, proponents of hydropower development, strengthens their argument by comparing thermal energy source as an imported commodity versus the locally available and long term services of hydroelectric dams. Sternberg (2008) pointed that hydropower has an appreciable role in national electric systems environmentally and economically,

and it plays a large part in effective coexistence of society and environment than is generally perceived. Foe example, hydropower projects use up to 80 percent local resources such as manpower, as compared with about 20 percent for thermal power projects built in developing countries that have to import fossil fuels (IHA 2003). Moreover, hydropower projects enable multiple uses, including provision of water for irrigation, and fisheries, regulating floods, enhancing navigation, etc. Indirect effects of hydropower projects include the possibility to export electricity to nearby markets, foster energy independence, avoid trade deficits incurred from buying thermal energy from abroad, etc. (IHA 2003). The practical contributions of hydropower projects should therefore not be overlooked, in order to assess their pros and cons in the context of developing countries.

When considering the environmental impacts of large scale hydroelectric dams, researchers such as Sternberg advise a detailed study and comparison with other options for electric generation. He point that to varying degrees, all forms of electric power generations have some negative impacts. But compared to the impacts of fossil fuels as a source of energy and their exacerbation of global warming, hydroelectric power is very attractive with little or no emissions (Sternberg 2008). At local levels, however, aside from its positive role in mitigating GHG emissions, studies show that hydroelectric dams have negative impacts on the local biodiversity and people. Some impacts are unavoidable unless decision makers adopt the 'no go' decisions, while most of the remaining effects can be mitigated through sustainable planning and management practices. I will focus on these issues later on in this section by illustrating some studies and experiences from developing countries.

In terms of the social benefits, proponents of hydropower development have tried to examine the physical characteristics of power plants and their effects on local, regional, global environment and societies at large. They highlight the anthropogenic causes of climate change and the subsequent vulnerability that can befall societies and the environment, in particular on poor peoples in developing countries. Hydropower on the other hand, does not involve any physical alteration as it is a water-in-water-out process

(Sternberg 2008). Thus there is no socially harmful physical change of water as a result of hydroelectric production.

The longevity of services rendered by hydropower plants is also a useful historical ground to argue that 'hydropower constitutes a legacy of electricity source with long viability and low maintenance costs, that one generation passes on to multiple future ones, as hydropower projects are usually paid for by the same generation that built it' (IHA 2003:73). Most hydropower plants at least in developed countries that were built by the 1970s have amortized their initial costs (IEA 2008).

Detailed studies have also been conducted on the social dimension of hydropower projects (IHA 2003, Kaygusuz 2004, Sternberg 2008,). The general conclusions of these studies indicate that participation of local people in the planning and operation of development projects is crucial. Many centrally planned hydropower and irrigation projects have failed to meet the desired social and economic benefits to the local people (IHA 2003).

As part of a solution many suggest that hydropower development can reduce the social disparities between local and regional communities provided that the projects are developed through a participatory approach based on stakeholder consultation and negotiations, with social and economic development agencies, and operated with high local manpower and resources (IHA 2003, Sternberg 2008). Moreover, participation of the local people can facilitate the involvement of affected people in the design and implementation of mitigation, enhancement of the project, and compensation measures (ibid).

Albeit rewarding benefits, hydroelectric projects that once showed great potential for economic growth did not sustain appreciable support, especially during the 1980s (Briscoe 1999). Opponents of large-scale hydroelectric dams argue that the decision makers have treated the dam site and reservoir area population and the ecology with woeful neglect (Sternberg 2008). In response, the world's grand financing agencies such as the World Bank have introduced official legislations and preconditions to give

financial support for large-scale hydroelectric dams in developing countries (Briscoe 1999).

The next section will focus on these issues from policy and planning perspectives. The challenges to the present and future deployment of hydropower projects are generally the concerns over undesirable environmental and social effects. The recognition and awareness of these effects has invited the intervention of a number of environmental NGOs and development organizations including the World Bank. The challenges then become extensive as the social and environmental concerns become part of the hydropower energy mix. And not least, more difficult challenges arise when human populations are forced to relocate.

### 2.2.2 Hydropower energy policy and the challenges for deployment

In the mainstream development policy, large-scale hydroelectric dams have been considered in engineering and economic terms to provide multiple services for the same installation costs (Edinger et al 2000). Nonetheless, the issue of energy in general and the hydropower energy development in particular, is generally far more than a sectoral issue facing decision makers. Through time and detailed evaluation of large-scale hydropower projects, public awareness and assimilation of knowledge of large-scale dams brought environmental and social issues into the mix of challenges associated with large-scale dam construction (WCD 2000). New standards and principles were added, new agencies for environmental and social advocacies were budding, and some embryonic subjects of environment and social attributes have matured culminating in the overall process of policy changes to embrace environmental issues and relevant social, cultural and heritage considerations.

Counter to the developers and proponents of hydropower projects who justify the benefits of dams as a source of electricity, flood control, water supply, etc., opponents of large-scale dams, after raising the issues of project-affected people and destruction of local environment, have forced policy makers to revise their policies at national and international levels. Fundamental concerns such as who should participate in the planning of large-scale dam projects and how involuntary settlers, i.e. project-affected

people should be part of the development process have been raised by environmentalists (WCD 2000).

In particular, after the concerted evaluation of the environmental and social impacts of macro-dams in developing countries by the World Commission on Dams, international organizations, financing agencies including the World Bank, NGOs, and national governments have included the environmental and social impacts assessment as conditions for policy formulations, amendments, and preparation of mitigation measures (WCD 2000). Hydropower policy is therefore a complex and multispectral issue demanding a multidisciplinary approach with a particular role to be played by dozens of governmental and non-governmental institutions.

The central debate about large-scale hydroelectric dams is that such big schemes damage ecosystems and local people in areas where dams are constructed. Millions of people have been displaced from their homes, and large areas of farmland, cultural sites, vegetation and wildlife have been inundated by reservoirs (WWF 2005, WCD 2000). A report by WCD in 2000 indicates that an estimated 40-80 million people have been displaced in this way. The Three Gorges Dam in China, for example, had displaced over 1.3 million people (Macartney 2007). Dams which have been feasible from techno-economic point of view have raised an increased public concern about environmental and social consequences of hydropower plants (Holder 2004). The importance of new forms of regulations and policies emanates from these complex issues and concerns (ibid).

In response to these concerns, a number of international organizations and NGOs have developed their own regulations that decision makers are supposed to comply with during the planning and implementation of large-scale hydropower development projects. According to Holder (2004),the impetus for the development of these regulations are the failure of the top-down approach of planning hydropower projects to address the negative impacts of dams especially on the livelihoods of the local people, and the local environment.

One of the benchmarks for the development of new forms of regulations and policies such as the environmental and social impact assessment of large-scale dam projects is the comprehensive study conducted by the World Commission on Dams(WCD) in 2000 (WCD 2000, King et al 2007). The commission has developed eight strategic priorities as a new framework for decision making that policy makers should consider thoroughly before implementing new hydropower development projects. These include: gaining public acceptance, comprehensive options assessment, addressing existing dams, sustaining rivers and livelihoods, recognizing entitlements and sharing benefits, ensuring compliance, and sharing rivers for peace and security (King et al 2007). These guidelines are largely acknowledged by a number of international organizations including the World Bank and NGOs like the International Rivers Network (ibid). The WB, regional development banks such as African Development Bank and NGOs play an important role in hydropower development projects in developing countries.

The World Bank and Regional multilateral development banks play an important role in the dam industry as important sources of funding, technical support and standard formulation for hydropower development projects. NGOs play increasingly important role in the formulation of the regulatory framework for dams (Cropper, et al 2000). NGOs play an active role in raising and challenging important issues, in identifying weaknesses in the regulatory frameworks and in proposing solutions to these weaknesses. They have also brought pressure to bear on the course of developments within large and powerful international institutions such as the World Bank, by launching global campaigns and pressing developed countries to back away from multilateral investments on large-scale dams. The larger NGO role is in monitoring and ensuring compliance with the regulatory frameworks (Cropper, et al 2000).

These framework points are designed to instruct decision makers to clearly evaluate the social and environmental consequences of a proposed project before action is taken. Financing agencies in addition to their own policies, experience marked pressure from NGOs not to support large-scale hydropower projects in developing countries unless the WCD's principles are strictly followed by policy makers. And these NGOs are

influential in some cases. Incidentally, this is the case of Gilgel-Gibe III hydropower project as well.

As a case in point, studying Gilgel Gibe -III hydropower project can shed light on how NGOs can affect the construction process of large-scale hydropower projects, a topic which will be examined in greater detail in chapter five. The decision stages mentioned in table 2.1 will be used to examine whether the project has fulfilled the international principles mentioned above.

Table 2.1: Five key decision stages proposed by WCD

| | |
|---|---|
| i. Needs assessment – | validating the needs for water and energy services |
| ii. Selecting alternatives- | identifying the preferred development plan from among the full range of options |
| iii. Project preparation- | verifying agreements are in place before tender of the construction contract |
| iv. Project implementation- | confirming compliance before commissioning |
| v. Project operation- | adapting to changing contexts |

Source: King, et al 2007

The decision stages mentioned in table 2.1 are among the basic principles that contribute to 'government policies, international standards, agreements and conventions, safeguard policies of multilateral agencies, guidance from professional associations, and codes of practice of the private sector and civil society' (King et al 2007:65).

### 2.2.3 Financing Hydropower projects

In the developing world, hydroelectricity has been financed mainly from public funding (Briscoe 1999). But a number of studies discussing financing of hydropower projects indicate that financing hydropower projects from international financing organizations especially in the 1990s, has declined significantly (Briscoe 1999). Briscoe marks that there has been a marked decline in World Bank lending for hydropower projects over the course of the 1990s. It has "fallen by about 25% as a share of Bank lending from 3.4% to 2.5% of the approximately $20 billion lent annually" (1999:463). The major cause of this decline, as mentioned by Briscoe, is the pressure from environmental groups on the bank (and on other multilateral agencies). For developing countries, financial constraints are the biggest challenge to the development of hydropower projects as a source of electric energy. These countries are virtually incapable of financing large-scale hydropower projects and thus have to meet all the international requirements to win the support from international agencies.

Nonetheless, as "the demand for electricity in developing countries is expected to triple in the next 30 years, the outlook for hydropower would appear to be rosy" and developing countries have often sought other financial means (Briscoe 1999: 463) What seems more likely is thus, developing countries have simply taken 'the path of least resistance', using their own resources for these controversial investments, and submitting projects to the WB and other external support agencies (ibid).

Ethiopia has faced similar setbacks with the environmental and social controversy surrounding the Gibe-III hydropower project and as a result no finance has been released for what the country has requested so far. Gibe III's contraction phase, although affected by financial problems, reduced manpower, and possible prolongation of project completion period, was not stopped from ultimate construction. Similar experiences have been observed in India, Brazil, Turkey and Uganda among others.

### 2.2.4 Public participation in hydropower project planning

Public participation in deliberations which lead to important project planning and development decisions is characteristic of the hydropower planning system in many countries (Gilpin 1995). Likewise, the idea that politicians were elected to govern and should be free of public interference has tended to wither away in many countries around the world (ibid).

In hydropower development industry, public participation must be included in the overall development process to make the project successful. The most important part of the initial procedure of hydropower project planning has to be the identification of people, groups, organizations, and institutions that have to be involved one way or another in the project planning and implementation. The implication of participative approach in hydropower development is that to make substantial hydropower projects happen requires the collaboration of multiple disciplines and organizations (IHA 2003).

As noted in the IHA's white paper, the field of hydropower is neither a monolithic organizational structure nor monopolistic practice (IHA 2003). The sector collectively involve specialists drawn from the environmental and social sciences, economics, biology, and the technical and engineering disciplines concerned with design and operations. Before any project, whether publicly or privately funded, is agreed, these specialists are on hand to advise the bodies and groups with whom full and participative consultation is necessary in the planning of a scheme (IHA 2003).

The key actors involved in the planning are government and local government departments, donor and financing agents, local stake holders, energy and water agencies, and environmental watchdogs (IHA 2003). The point is that participants with different knowledge, interests and responsibilities have the capacity to influence actions related to planning and development of hydropower projects. Thus, any hydropower project planning and implementation process has to identify those groups with a significant stake that need to be consulted and participate in the development of environmental and social impact assessment process (fig. 2. 1). In most of the large-scale hydropower development projects, there are certain outstanding contentions facing the process of

planning, construction and implementation of these schemes. These ideas can give substantial information for decision making and contribute to improve or modify the project prior to implementation. It can help to tackle problems during the early phase of the project.

## 2.3 Environmental and social impact assessment (ESIA), of hydropower projects

An impact assessment is conceived as a policy and management tool for planning and decision making (Modak et al 1999). It is one of the key policy tools employed 'to identify, predict, and evaluate the possible consequences of proposed development projects, plans and policies' (1999:12).

### 2.3.1 Environmental Impact Assessment

Impact assessments of development projects have often been dominated largely by Environmental concerns(Modak, et al 1999).The first environmental impact assessment legislation was established in the U.S.A. in 1969 when the need was arised to perform assessment of the US Federal projects(ibid). This idea has been diffused extensively into different countries and has become a policy instrument for international or**g**anizations, financing institutions and national governments seeking to establish development projects. It is widely believed that environmental impact assessment(EIA) is conceived as an early warning process (Modak et al. 1999), and it became a part of formal procedural, and in many cases, legal requirements to plan and support large-scale development projects. Donor agencies in many developed countries, and development organizations such as the World Bank made EIA one of the major requirements to support proposed development projects like large-scale hydroelectric dams. The WB for example, introduced an Environmental assessment policy in 1989; 'partly due to pressure from Washington based environmental groups who demanded the Bank take greater responsibility for the social and environmental repercussions of the Bank-supported projects and partly due to a growing concern for environmental issues in

general' (Linaweaver 2002:10). The EIA has been the subject where the advocacy path between NGOs and the World Bank was manifested.

The primary objective of EIA as put by Modak et al (1999) is to ensure that potential problems are foreseen and addressed at an early stage in the project's planning and design. In order to address the potential challenges at the initial phase of the project, the assessment should provide information on the environmental, social and economic benefits of proposed projects which should then be presented to decision makers. The result of an EIA, can then give basic information to operate the project in a way that it can provide the proposed benefits while the local environment is not impacted inadvertently (Modak et al 1999). Specifically an EIA identifies the sources of impacts from the project activities (ibid).

The knowledge base of an impact assessment should be carefully evaluated at the outset of the appraisal process, as well as the use to be made of multidisciplinary teams within it (Lee et al 2001). A multidisciplinary approach is the key methodology for conducting an impact assessment of development projects including hydroelectric dams. Lee et al (2001) suggest that skill deficiencies should be addressed, in line with the step-by-step strategy, through supporting measures for the preparation of E IA guidelines, training courses and institution strengthening.

The major benefit of using EIA in project planning is to prevent avoidable losses of environmental resources (Modak et al 1999, WB 2003). While the major objective of establishing development projects was centered on economic growth, the efforts to prevent the loss of important environmental resources were generally low (Modak et al 1999). As Modak et al mentioned: "a feature often overlooked by various developers is that a well-prepared EIA incorporated into the planning and design of a project can save the developer and regulatory agency valuable time and expense" (1999:17). If EIA is performed early enough to be considered during the decision-making phase, says Modak et al, delays in construction and operation owing to various procedures can be minimized. Improper planning and design will lead to 'unacceptable levels of environmental deterioration. And this may require costly rectification, remediation or

replacement' (Modal et al 1999:18). For example, in Ethiopia's Gibe III hydropower project an environmental and social impact assessment (ESIA) was conducted by the consultants assigned by EEPCO. As the pressure by international NGOs on financing agencies was strong, one of the financiers, African Development Bank (AfDB), following its compliance assigned its own team in 2009 to reassess the project prior to approval of financial grants. In effect, AfDB halted the financial support to the project. EIAs should therefore be initiated as early as possible prior to the final decisions of the project implementation and should also include the monitoring of project implementation and operation and eventually an audit of the project by the authority in charge.

During the 1980s many countries formally embraced EIA, but it was not until 1990s that many developing countries approved EIA legislation (Modak et al 1999).

The effectiveness of EIA depends on the fulfillment of some key conditions (Modak et al 1999). Two of these main conditions according t Modak et al (1999:17-18) are: the promulgation of legal regulations by law unambiguously leaving no misunderstanding about the interpretation of the obligation to carry out EIA, and ii) rational and open decision-making based on factual information and rational arguments, i.e., start an EIA procedure in an open way to consider alternatives and to absorb new information. Usually, 'the main reason for an ineffective EIA is lack of a transparent approach. When the decisions are already made, EIA is used as a defense-in-retrospect and is guided to this result' (Modak 1999:18). The room for decisions is restricted by earlier decisions at national level. The room for public participation, and an independent review and central information are also some of the requirements that can contribute for effectiveness of EIA (ibid).

Modak et al (1999:21) have summarized five key principles in managing EIA: i)focus on the main issues, ii) involve the appropriate persons and groups, iii) link information to the decisions about the project, iv) present clear options for the mitigation of impacts and for sound environmental management, and v) provide information in a form useful to the decision makers.

### 2.3.2 Social impact assessment:

A social impact assessment or SIA is often used to refer to elucidating how people are affected by development interventions (WB 2003). Social impacts involve the changes to individuals and communities due to a proposed development plan and action that alters the way in which people live, work, play, relate to one another, organize to meet their needs and generally cope as members of society(U.N. 2006). SIAs may further denote an effort to assess or estimate the social consequences that are likely to follow from specific policy actions and government actions including large projects (ibid). It is also defined as a process of research, planning and management of social change or consequences (positive or negative, intended or unintended) arising from policies, plans, programs and projects (Taylor et al 1995, in Heinsohn 2007).

SIAs deal with future social consequences of an action like large-scale hydroelectric dam construction. In some countries, the word 'environment' is interpreted in its broader context comprising all dimensions of the environment (social, biophysical, economic, political, cultural, governance, etc) (Heinsohn 2007). In this context social dimension is subsumed the all-encompassing definition of the 'environment'. In some other countries such as Ethiopia the program is called an Environmental and social impact assessment (ESIA). For the purpose of this thesis I will use ESIA referring to the study of both Environmental and social dimensions of hydropower dams as a package in the project planning.

There have been strong critiques of the application of impact assessments indicating that impact assessments in development projects are just a required procedure to ensure that the project development meets government requirements or that it achieves optimal development (Barrow 2000). It is also argued that although impact assessments may seem quite objective, they are seldom free from pressures and can often be influenced by political maneuvering (ibid). Particular interest groups targeting economic growth alone may use an ESIA to legitimize their own agenda and can be difficult to ensure its objectivity. The mechanisms to ensure the neutrality of ESIAs in part depend on the

country's governance and transparency to open the room for participation and provision of required information.

### 2.3.3 Ethiopia's ESIA

Ethiopia's EIA guideline was endorsed in 2002 Under Proclamation No. 299/2002 aiming mainly at making environmental impact assessment mandatory for categories of projects specified under a directive issued by Environmental Protection Authority (EEPCP 2010). The guideline divides projects in to three schedules. Among schedule 1 power projects that need EIA are hydropower projects having dams over 15 meters and ancillary structures covering a total area in excess of 20 hectares and/or reservoir with a surface area in excess of 250 hectare and displacement of 100 people. In this proclamation one of the main duties of the project owners is: undertake a *timely* environmental impact assessment, identifying likely adverse impacts, incorporate the means of their prevention, and submit the environmental impact study report accompanied by the necessary documents to the authority. The authority then has the power to approve or reject the project based on the quality of the EIA study.

The Social impact assessment in the country is guided based on the proclamation No.455/2005, "Proclamation to provide for the expropriation of land holdings for public purposes and payment of compensation". In this proclamation article 3.1 of the proclamation empowers the wereda and urban administration to expropriate the rural or urban land for public purposes where it believes that it should be used for a better development to be carried out by public entities, private investors, cooperatives, etc. or such appropriation has been decided by regional or federal organs for the same purpose. This proclamation also states in detail about the compensation of the displaced land holders. Article 8 states that a "land holder whose land holding has permanently been expropriated shall be paid displacement compensation which shall be equivalent to ten times the average annual income he secured during the five years preceding the expropriation of the land"(EEPCO 2010:14).

## 2.4 Institutional roles in Ethiopia's hydropower energy policy

Ethiopia's electric energy policy is based almost exclusively on large hydropower production using the country's high potential for hydroelectricity development (Hailu 2000). In this sector a number of government organs are involved in policy formulation, project implementations, monitoring and evaluation activities.

Proclamation No. 41/1993 provides the Ministry of Mines and Energy (MME) the principal mandates to formulate energy policy, and legislatives. Among the main duties of the MME according to this proclamation, are the formulation of policies and strategies of energy development, and the follow-up and supervision of implementation (Hialu 2000). Moreover the MME is empowered to issue directives to the implementation of the respective proclamations. Thus each of the operational organizations including the Ethiopian Electric Power Corporation (EEPCO), are supposed to report to the MME. The proclamation furthermore gives MME the mandate as developer of the policy for the energy and mining sectors, and as a key organ in 'implementing that policy with the operating companies under its purview' and monitor the projects and their budgets (Hailu 2000:22-23). One observes, thus that a single government office is responsible for formulating energy laws, policies and regulations, following the implementations, developing and monitoring the hydropower projects and managing respective budgets. I shall examine the problems of institutional capacities in chapter five of this thesis.

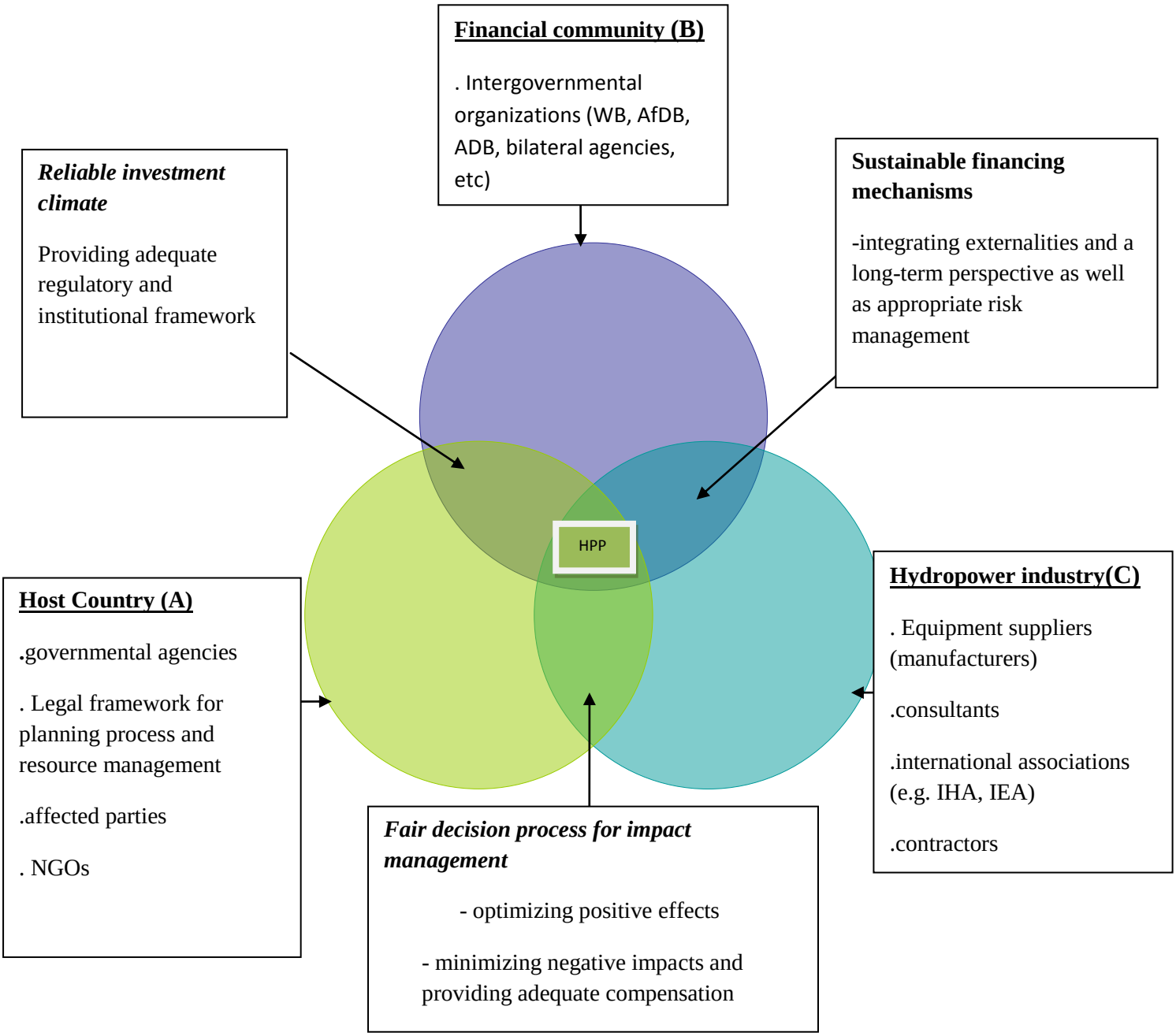
After 1993 the role of MME was restructured and its role was reduced with the intent to detach the operational entities from the MME and to establish independent government-owned enterprises. The Ethiopian Electric Power Corporation (EEPCO) is a statutory corporation established by the Council of Ministers Regulation No. 118/97. This sector is empowered to engage in the business of electricity generation, transmission and distribution in Ethiopia and is owned by the government. As a government regulatory body, EEPCO has the mandate to regulate private individuals who generate and sell electric power from diesel generators to rural villages to do their businesses in consultation with EEPCO.

The other government organ involved in devising the energy policy is the Ministry of Water Resources Development (MWRD). The Ministry of Water Resources published the "Water Resources Management Policy" in 1999 that directly influences the hydropower resources development. This policy has included the hydropower subsector policy with an overall objective of enhancing sustainable development of water resources, and meeting national energy demand as well as cater for external markets to earn foreign exchange (Hailu 2000). The specific objectives of the hydropower policy include the following:

- Ensuring that hydropower development projects are studied, designed, constructed, operated and utilized on an economically viable basis to acceptable technical, environmental and safety standards;
- Encouraging involvement of the private sector in the development of hydropower;
- Ensuring that the negative environmental impacts of hydropower are mitigated to the fullest extent possible; and
- Subject hydropower development schemes to strict environmental and stakeholder considerations as well as meeting economic criteria.

The hydropower policy document of Ethiopia is broad and extensive. I have extracted a few policy statements which are most relevant to this study. These policy statements will help to explore whether decision makers have been following the implementation of these frameworks strictly. In hydropower development, it must be understood that there are international principles which instruct national decision makers to open their hydropower development policies for participation of different interest groups including the project-affected/ local people. It is important to underscore that financing decisions by international organizations to support hydropower projects are reluctant if the planning process and the content of the project document display a lack of rigor. In this thesis thus Ethiopia's hydropower policy and planning procedures will be scrutinized based on these general principles.

**Fig 2.1 Diagram showing Actor cooperation in Hydropower project development**




Source: adapted from IHA 2003

Figure 2. 1 depicts the major actors in hydropower project development and the pertinent challenges that may affect the process. The center represents hydropower project (HPP) and is assumed to be an optimal situation where the actors can reach an agreement. Where concessional positions are reached by all actors, the controversies

may decline such that it will have minimum effect on the project implementation. In this process, the major challenges will rest upon the host country. How do host countries attract the financial community and the hydropower industry depends on the methods and procedures of project planning followed by the host country as a project owner. Ethiopia's Gilgel Gibe-III hydropower will be explored based on this. It is important to note that many hydropower projects in developing countries are state-owned.

In general, it can be said that the actors required by the project and the participation of these actors in the particular setting could have positive contribution for the planning and implementation process of the project. In other words, one of the main activities that inform decision makers during hydropower project planning is the environmental and social impact assessments of the project. When this process is conducted in a transparent and participatory manner, it is assumed that there will be a general concession among participants and the challenges affecting the project implementation become less.

# CH. 3. Hydroelectric Energy Development in Ethiopia

This section employs a descriptive approach to Ethiopia's hydropower sector in general and the Gilgel Gibe III hydropower project in particular. It begins with the history of the hydropower sector in Ethiopia and the present status of the country's potential for hydroelectric development to serve its purposes in Ethiopia's sustainable energy future. Then, it highlights the physiographic and socio-economic features of the area where the Gilgel Gibe III hydropower project is under construction. In line with this, this section of the thesis will provide important background to analyse the discrepancies between the potential and the current status of the hydropower sector in Ethiopia. This section will focus particularly on the physiographic features of the Omo-Gibe valley as well as the socio-economic conditions of the local people inhabiting the project area where the Gilgel Gibe-III hydroelectric dam is under construction.

## 3.1 Historical overview

The first electric generator was introduced by emperor Menelik II in 1898 to light his palace in the capital city, Addis Ababa. [4]Few years after the WWII, in1948, the electric sector became a state-run institution named "Shewa Electric Power", with a mandate to generate, distribute and sell electricity. Its service was of course, confined to the town of Addis Ababa and its surroundings of the then Shewa province. Later on the firm underwent a series of structural changes and reorganisations during different political regimes. In 1956, Shewa Electric Power was substituted by the Ethiopian Electric Light and Power Authority (EELPA). After this period, electric service extended to provincial and other smaller towns in the country at a slow rate with incomplete spatial coverage (Solomon 1998). Shortly after the fall of the military regime in 1991, EELPA was restructured and reorganised in 1997 as the Ethiopian Electric Power Corporation (EEPCO). This public firm is responsible for producing, transmitting, distributing and selling electricity all over the country (Solomon 1998, UNESCO, 2004).

[4] http://waltainfo.com/EEPCO/about.htm. 'Milestone in the history of EEPCO' (12.05.210)

### 3.1.1 Hydroelectric generation

Hydropower is not a new source of electricity in the history of Ethiopia's energy sector. Its beginning goes back over seventy years. The first hydroelectric dam in production was Aba Samuel hydropower plant some 30 km south-west of Addis Ababa, commissioned in 1939 with a generating capacity of 6.6MW (Solomon 1998, UNESCO 2004). Then about 70km south of Addis Ababa on the Awash River, the Koka hydroelectric plant started service in 1960 with an installed capacity of 43MW. Later on several other power plants were commissioned at different locations around the country (table 3.1).

In general, the beginning and expansion of electricity in Ethiopia as part of modernization had a center- periphery characteristic starting at the Menilik II palace, the capital city- Addis Ababa-, the towns around the capital city, i.e., the then Shewa province and then to other major towns of the country. The other important point is the central role of hydropower in the process of modern electric supply in Ethiopia. It began serving around the same period with many other hydropower dams in the western countries. The issue, however, is this sector didn't show a marked improvement albeit a long history of giving modern services in Ethiopia.

**Table 3.1** Ethiopia's hydroelectricity Generation Installed capacity

| No. | Name of hydro plant | Capacity (MW) | In-service Date |
|---|---|---|---|
| 1 | Koka | 43.20 | 1960 |
| 2 | Awash II | 32 | 1966 |
| 3 | Awash III | 32 | 1971 |
| 4 | Finacha | 134 | 1973/2003 |
| 5 | Melka Wakena | 153 | 1988 |
| 6 | Tis-Abay I | 11.4 | 1964 |
| 7 | Tis-Abay II | 73 | 2001 |
| 8 | Gilgel Gibe I | 184 | 2004 |
| 9 | Tekeze | 300 | 2009 |
| 10 | Gilgel Gibe II | 420 | 2010 |
| 11 | Beles | 460 | 2010 |
| | **Sub Total** | **1842.6** | |
| | **SCS*** | | *Self contained system |
| 1 | Yadot | 0.35 | |
| 2 | Sor | 5.00 | - |
| 3 | Dembi** | 0.80 | ** not in service |
| | **SCS Sub Total** | 6.15 | |
| | **Total** | **1848.75** | - |
| | Gilgel Gibe III | 1870 | Under construction |

Source: Extracted from EEPCO's 'Facts in brief' 2009/10.

http://www.eepco.gov.et (20.12.210)

As we can see from table 3.1, in 2004, Ethiopia's installed hydroelectric capacity was 662.6MW. The three new hydroelectric plants, Gibe II, Tekeze, and Beles, have not yet started commissioning in their full capacity due to geological and hydrological factors. For example, Gibe II project has been out of service a few months after inauguration due to geological problems within the 25 km long tunnel. It has been blocked by muddy land slide within the tunnel and this unexpected impact takes time to resume services. The other two, Tekeze and Belles projects have not been completed according to the project's time plan and are not yet connected to the main grid to give their full services. Tekeze project has also been encountered by land slide and shortage of rainfall along the catchment area that flow into the reservoir. This may indicate that large-scale hydropower construction in Ethiopia, and generally in developing countries are usually subjected to various expected or unexpected problems causing the delay of project completion and incurring additional expenses. While the country's population and the energy demand are increasing rapidly, the electric production and access for it has been one of the lowest in the world (Wolde-Ghiorgis 2004).

To compare between hydroelectric production and the population increase of the country, Ethiopia's population in 1960 was 23.6 million[5]. This number has increased to 39.9 in 1984, 53.47 in 1994 and 73.91million in 2007(CSA 2008). The projected figure for 2010 is 79.45 million (CSA 2009). In 1997, the country's electric energy generating capacity was 1469 GWh/year, while the projected population number in the same year was 58.1 million. At this rate, electric service has been insufficient to provide extensive service all over the country, and the electric energy consumption per capita is one of the least in the world. In 1997 and 2002, for example, the electric energy consumption per capita was 23.16 and 25.01 KWh/year respectively, which is among the least in the world (Kasana, et al 2005).

EEPCO maintains two different power supply systems. The Interconnected System (ICS) which is mainly supplied from hydropower plants and the Self-Contained System

[5] http://www.un.org/popin/regional/africa/ethiopia/index.htm
' Ethiopia: Population information resources' (12.12.2009)

(SCS) which consists of mini-hydropower plants and some isolated diesel generating units widely spread over the country. Until 1997, the corporation was running an installed capacity of 371.6MW generated by the Inter-connected Systems (ICS) and a fraction of this total, less than 6MW, from the self-contained system (SCS) of small hydropower stations (Solomon 1998). This has increased to 662.6MW in 2004(table 3.1). Although there are some changes in hydroelectric production in the country, this change as compared to the country's water resource potential and the demand for electric services, is much lower than its optimum level, and in addition below many other African countries (UNESCO 2004).

## 3.2 The potential and current status of hydropower sector

In 1964, a study conducted by the U.S. Bureau of Reclamation (USBR) estimated that if implemented, hydropower and irrigation projects along the Blue Nile could bring some of the best economic returns of any such facilities in the world ( Desalegn 1999, Guarisso & Whittington 1987, in Wu, et al. 2006). Some studies set the economically exploitable potential in the order of 30,000 MW (Solomon 1998, Wolde-ghiorgis 2002). On the other hand, recent studies by (EEPCO) ascend the gross exploitable potential to over 45,000 MW (EEPCO 2009). The common denominator of these studies is that both and even many other studies have ascertained the prevalence of high water resource potential that can be useful for the country's energy future.

The largest share of the country's hydropower potential is contributed by the rivers flowing towards the west and south-western parts of the country. The Abbay (Blue Nile) water system which flows to Sudan and Egypt has the highest potential at 48.9%, followed by the Omo-Gibe basin at 22.7%, where the Gilgel-Gibe-I, II and III hydropower projects are situated. These two river basins hold about 72 percent of the country's hydropower potential. According to the hydropower development plan of EEPCO, downstream from the Gibe III dam, another hydropower project called Gibe-IV will be developed in the near future to produce about 2000 MW electric energy. Additionally, the Omo-Gibe river has a potential of 16 large (over 60 MW), and 4 small-scale plants (less than 40 MW), (Solomon 1998). Topographically, like most of

Ethiopia's river basins, the Omo-Gibe river cascades through a rugged topography before it reaches the flat plains of southern Ethiopia at Lake Turkana. Damming this river at the middle and upper locations can therefore have a relative benefit in terms of economic and social costs. Nonetheless, the negative impact that decision makers have to take into account in terms of social and environmental effects is the reduction in the level of water flow during the one or two years of impoundment period to fill up the reservoir. This has a serious impact on the downstream ecology and community as there are extensive national parks, and thousands of ethnicities that depend on the river in their everyday life.

At present, the production, supply and access of electric energy in Ethiopia is generally deficient despite several decades of operation in the country. Of the 30,000 MW of projected exploitable reserves, less than 3% had been developed by 2004(Wolde-Ghiorgis 2004). Between 1995 and 1998 the annual installed capacity was about 418 MW of which 90 % was provided by hydropower plants (Solomon 1998). The capacity deficit for the same period was estimated to be 300 MW (ibid). By 2004 the country's installed capacity was 493 MW. This has increased to 791 MW by 2007 after the commissioning of new power plants including the Gilgel-Gibe-I injecting 184 MW to the ICS (Awlachew et al 2007). Moreover, a number of hydropower development projects including the Gilgel Gibe II, Tekeze, and Beles projects have been completed in 2010. The government plan for energy development indicates that by 2009/2010, the country's energy generating capacity will increase to 2218 MW (Awlachew et al 2007). When the Gilgel Gibe I hydropower was completed it was assumed that the demand for electric supply would be met in the mean time. At present, nonetheless, the country is at a crossroad of energy crisis. There is frequent shortage of electricity all over the country. The annual GDP for 2008/09 has declined by 1% due to shortage of electric energy, 90% of which comes from hydropower[6]. Industries such as cement, leather, and textiles, and hotels and residences have been receiving electricity on shift basis.

[6] http://af.reuters.com/article/investingNews/idAFJOE61402Q20100205 (5 .02.2010)

On the other hand, it is indicated that Ethiopia continues to be one of the countries in Africa where hydropower has the potential to play the greatest role in future economic development (Kyaruzi et al 2005). The country describes its hydropower potential as one of the most valuable resources or as a backbone to future development. EEPCO's five year plan shows that the country will produce a total of 13472MW by the end of 2015.[7]

## 3.3 The Study Area: Topography, Location and Climate

Topographically, Ethiopia in general is characterized by a large central plateau surrounded by lowland plains; and a chain of high mountains with markedly descending topography in all directions of the country. For good reasons the country is dubbed "the water tower of Eastern Africa" The complex topography of the Ethiopian highlands orients the country's hydrologic systems roughly into northeastern, northwestern and southwestern flowing basins. Ethiopia's Elevation varies between 4620 m a.s.l, at Mount Ras Dashen, in northwestern Ethiopia, and 114m below sea level at the Dallol deep salt flats, one of the hottest areas on earth located in the Denakel depression, in the northeastern part of the country. Towards the west and southwest of the central plateau, the topography descends markedly to the plains of Sudan where the Blue Nile meanders its way to Egypt and the Mediterranean Sea.

The source of the Gibe-Omo river, on which the Gilgel-Gibe III hydropower project is being built ,flows from the southwestern highlands southwards to Lake Turkana; a saline lake at the border between Ethiopia and Kenya. Like most of Ethiopia's river basins, the Omo-Gibe basin is characterized by deep and steep sided valleys making it conducive to harnessing hydroelectric power at a number of locations along the river system. The Gibe III hydropower project is located within the Gibe-Omo basin some 300 km south of Addis Ababa. The scheme, from the root of its reservoir to its tailrace outfall extends over a meandering fault corridor of 155 km long (EEPCO 2009). The reservoir stretches extensively over five zonal administrations and twelve *weredas* or

[7] http://nazret.com/blog/index.php/2010/05/02/ethiopia_unveils_ambitious_five_year_ene (27.12.2010)

(districts). The down stream area stretches from the dam-site southwards up to Lake Turkana. The coordinates of the project area are within a range of 7.572 degrees North and 31.229 degrees East (EEPCO 2009). The altitude of the location where the Gibe III dam is under construction is 650 meter a.s.l. The dam height will be 240 meters. Ecologically, all the natural vegetation within the range of 890 meters high and 150 km long including the previous bridge above the dam site connecting the peoples of Dawro and Wolaita zones will be submerged.

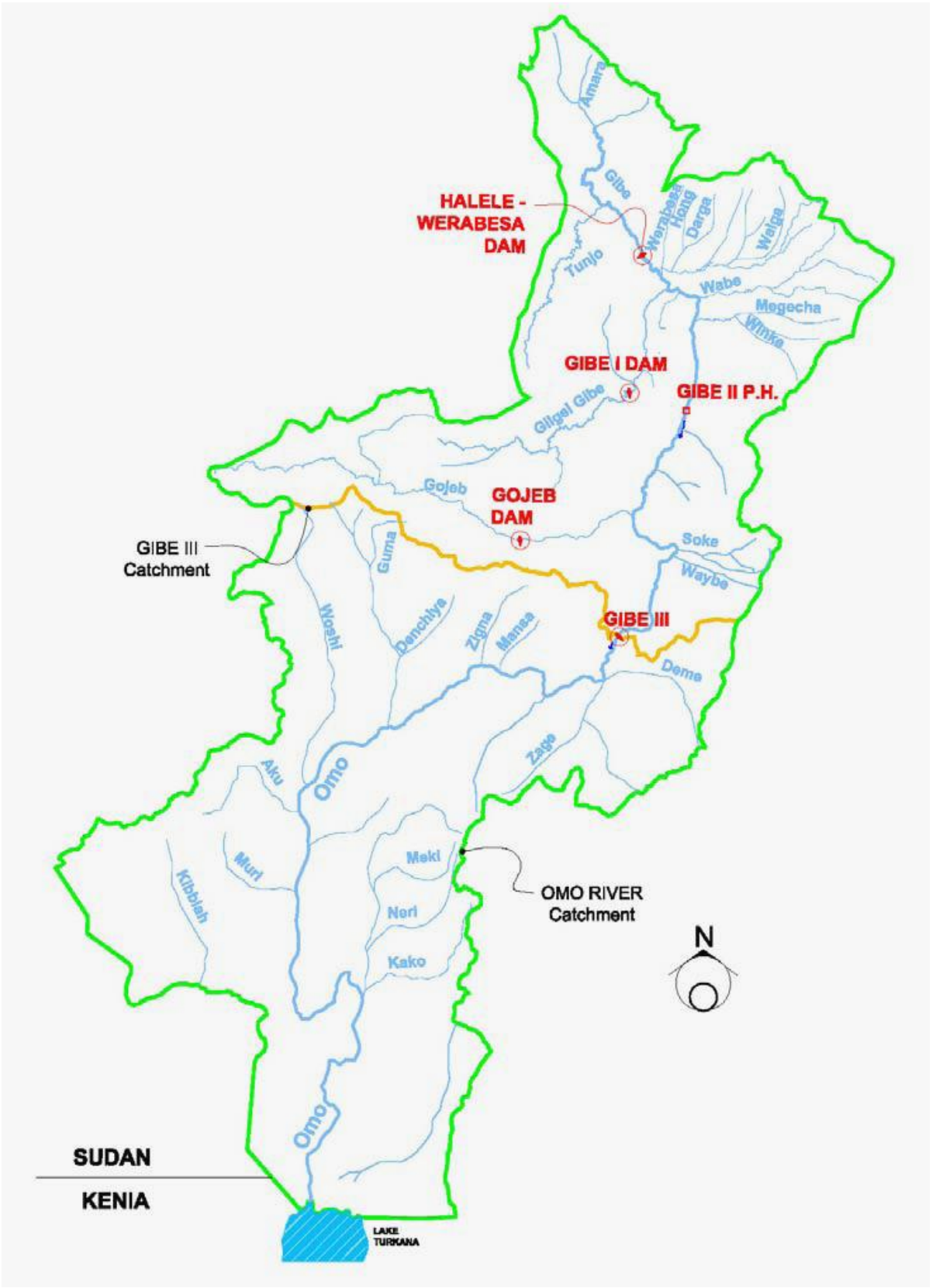
The climate of Omo-Gibe valley is classifiable as tropical humid in the highlands that include the areas surrounding Jima and around the headwaters of one of the major tributaries; the Gojeb River (fig. 3.1). For the rest, and largest part of the watershed the climate is classifiable as a tropical sub-humid, intermediate between the tropical humid and the hot arid climate characteristic of the southernmost part of the floodplain toward Lake Turkana. During the wet season the area experiences rainfall mainly due to the Atlantic moist component (UNESCO 2004). During the dry season the moist air comes from the Gulf of Aden and the Indian Ocean, causing little rains. In general, southwestern Ethiopia experiences higher annual rainfall than the other parts of the country.

In this basin the precipitation has a north-south orientation in terms of quantity, while the temperature rises significantly southwards towards the mouth of the river increasing the rate of evapotranspiration (EEPCO 2009). Rainfall declines sharply towards the lower southern parts of the basin. In the northern and western parts of the basin rainfall can exceed 1900 mm/year and reduces to about 1200 mm/year in the lower part of the Gibe III project area (ibid). Meteorological records indicate that precipitation along the Omo-Gibe basin declines sharply to less than 300 mm/year near Lake Turkana where the altitude is not more than 350 meters above sea level (Awlachew et al 2007). Around Gibe III hydropower project, the average annual air temperature is 20.4 °C whereas the temperature at Lake Turkana ranges between 31 $^{0}$C to 33 $^{0}$C (EEPCO 2009, UNEP 2005). Provided that variations in temperature imply variations in evapotranspiration,

large amount of water can be saved if dams are built in the highland areas of the country.

The hydrological pattern of the basin is strongly unimodal with maximum rainfall from May to September which covers mainly the south-western part of the Blue Nile basin, the Baro Akobo basin and the Western part of the Gibe-Omo basin (UNESCO 2007). As shown in figure 3.1, the Omo-Gibe River collects water from a large number of tributaries making it the second largest river basin in terms of hydropower potential in Ethiopia, only after the Abbay/ Blue Nile river system. Due to this the Omo-Gibe basin is among the country's priority river basins for hydropower development (fig. 3.1).

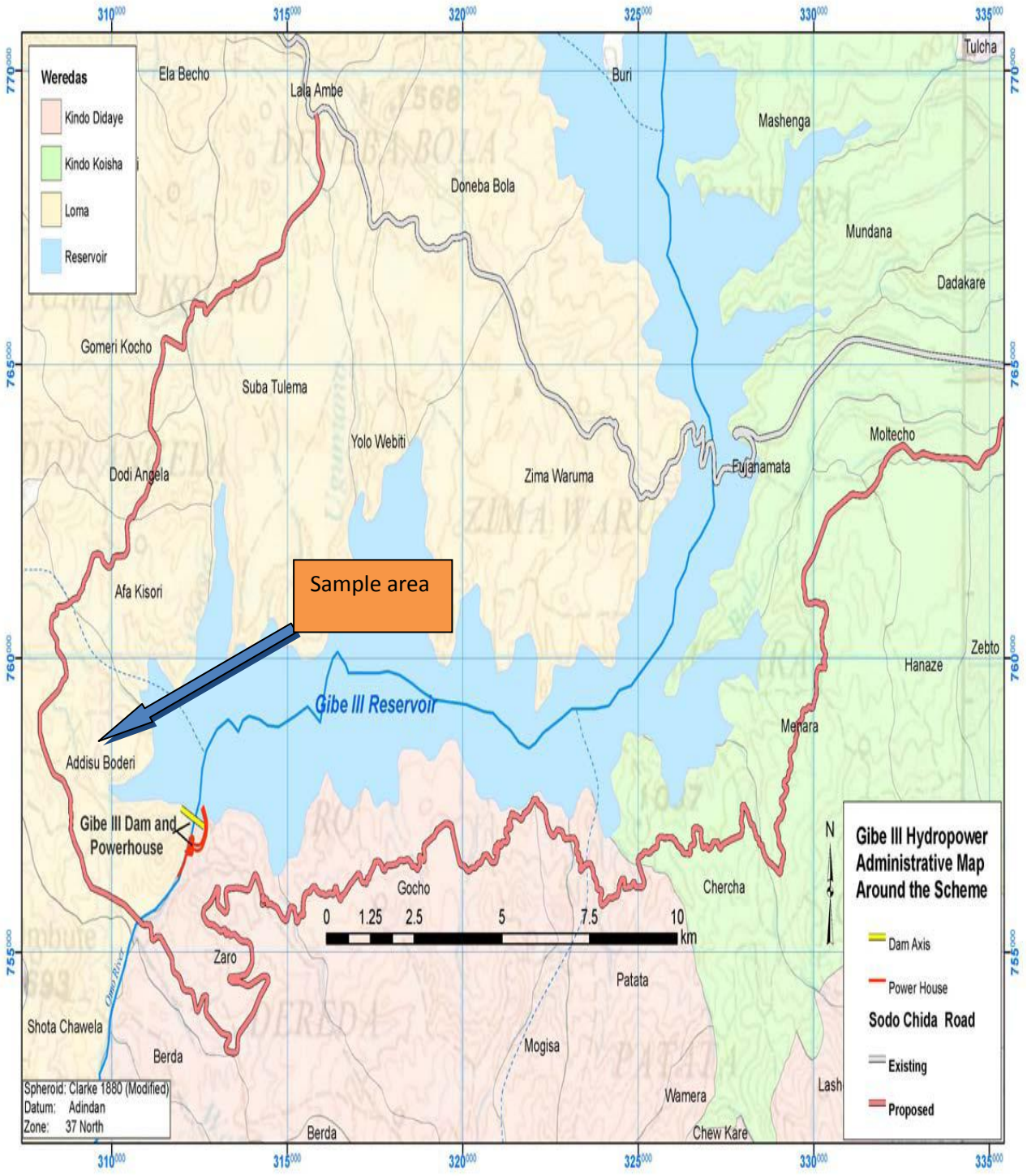
Map 3.1 the catchment area of Gilgel Gibe III hydropower project




Source: EEPCO 2009

Gibe III power dam is a continuation of the Gibe-I and Gibe-II cascades which produce 187 and 420 MW respectively. The Gibe-II power scheme is a damless power plant receiving high pressure water from Gibe-I through a 26 km long tunnel. This hydropower project was accomplished without major social and environmental impacts, and there was no magnified opposition from international NGOs on this project. Then Gilgel Gibe III is located along the lower course of the river, some 155 km downstream of the Gilgel Gibe II powerhouse. This project is expected to produce 1780 MW of electric power by the end of 2012. It has a high storage capacity covering an area of 211 $km^2$, extending all along the faults some 150 km towards the Gibe II hydropower plant. As a large-scale dam project, this plant has received the largest investment in financial and human resources in Ethiopia's history of hydropower development, costing over 1.7 billion U.S.D. and employing thousands of workers. However, as will be dealt in further detail in chapter five of this thesis, the Gilgel Gibe III dam is at the center of a contentious economic, social and environmental debate.

Map 3.2 Partial view of GIBEIII reservoir and administrative areas:




Source EEPCO 2009

Note that Gibe III reservoir stretch 150 km covering 11 Weredas.

## 3.4 Demographic and Socio-economic features

Stretching to the northwest with a long and meandering river valley, with numerous tributaries, Gilgel Gibe III storage crosses nine *weredas* (districts) under four zone administrations all along the east and west banks of the 155 km long valley (fig. 3.2). Loma wereda in Dawro zone and Kindo Koysha wereda in Welayta zone are the main settings of the ongoing dam construction. Key informants for this research were taken from Addisu Bodere Peasant Association in Loma wereda.

Above the dam site and along the 155 km of the basin that will be submerged are five zone administrations and 11 weredas. More than 13 different ethnic groups live in the 11 weredas along the river basin. The major ethnic groups in the project area are - Wolayita (23.0%), Dawro (6.9%), Kembata (6.7%), Tembaro (5.0%), Oromo (20.4%) and Hadiya (25.3%) and less than one percent of Amhara, Keffa and Sodo Gurage, Silte and Sebatbet Gurage. The rest of the ethnic groups constitute less than 3.3% of the total (EEPCO 2009).

Estimations in 2006 shows that over 2.34 million people live in the 11 weredas, comprising 49.7% males and 50.3% females, marking the area as one of the most densely populated in the country (EEPCO 2009). According to some studies, the average household size for all affected Kebeles is about 6 persons per household with a range from 4 to 7 persons. The average wereda population density in the project area is estimated to be 278 persons/$km^2$. Within the project affected PAs, the average population density is about 128 people/$km^2$ (EEPCO 2009). In the project weredas 95.6% of the population lives in a rural setting. Settlement in the project area increases towards the cooler and more habitable highlands (above 1,300 m. a.s.l.) where almost all of the population lives (ibid). Field studies reveal that along the upper section of the river there are patches of scattered settlements at a distance of 200 meters from the bank of the gorge (EEPCO 2009).

The project area falls into the Kolla/hot agro-ecological zone and has one annual growing period during the time of the summer monsoon (Keremt) between mid-June

and September. The farming system around the project area especially in the highland area is well known for its complexity and variety of crops that are grown. The farmers in the project area produce small quantities of a wide range of crops including cereals, roots, tubers, pulses, spices, coffee and fruits. Additionally, small farm-land holdings are used as grazing areas after crop harvesting. Post-harvest grazing is important to the farmers' livestock, notably cattle which are an integral component of the farming system in the project area as is the case predominantly practiced in the country's farming system. Within the valley, farming activities are not predominantly practiced due to topographic steepness and prevalence of livestock diseases such as trypanosomiasis. It is predominantly used for seasonal grazing, firewood collection, etc. Exchange of commodities and other social relations at the upper part of the catchment around the Hadiya communities is performed by crossing the river through traditional means.

The highland area around the Gibe III reservoir is characterized by a high human population density, with extreme levels of land pressure and consequently, small average farm sizes. The average farm size (on the highland) for the weredas is about 1.0 ha and as low as 0.2ha in some areas with fragile land resources and minimum crop production (EEPCO 2009). Moreover, crop failures are fairly common because of seasonal failure of the rains the further south toward the dam site one goes. More commonly two types of farming activities are practiced in this area. Few farmers have oxen use to plough their small fields, so the majority of them use hand tools such as hoes. The small farm size, low productivity, high population size and poor health services (especially for malaria treatment), and low school completion rates, etc. are among the main social and economic problems in the project area.

With regard to school, although primary school coverage is relatively improving throughout the country, school dropouts are very high in the area due to geographic isolation from schools, and so economic difficulties associated with schooling children at long distances. Generally, considering the spatial and ethnographic characteristics of the project area, the Gilgel-Gibe III hydropower project will have different direct and indirect effects on the livelihoods of local people. In line with this is how policy makers

are prepared to address these issues, which will remain a challenge that will need a concerted effort to formulate and practice sustainable mitigation measures. At present levels of technology, damming in terms of engineering, although challenging, should not be considered as an ultimate problem, considering Ethiopia's topography which is ideal for hydroelectric dam development. However, the issue becomes more complex when the social and environmental dimensions appear on the scene. And this is the situation where a number of actors, including the victims of big hydropower dams raise their voices in a way that decision makers must account for their livelihoods and their local environments during the planning and implementation process of hydropower dams.

In a number of studies and researches on large-scale hydroelectric dams, the social and economic impacts of such projects, especially on the local people are well documented (e.g. Gutman 1994, WCD 2000, Barrow 2000). The literatures show that to achieve a successful hydropower development, impacts on people and local environment, including farmland, settlement areas, rangelands, etc. must be minimum and mitigable. Any development project should include an informed and beneficiary subject. However, people are often being displaced amass with improper or sometimes without compensation, fall ill due to waterborne diseases such as malaria from stagnant water behind the dam. People, furthermore, are repeatedly peripherised, which is a known issue in planning and implementation process of large-scale dam projects (Gutman 1994).

In this thesis, based on the information collected from the local people in the Gibe III hydroelectric project area and some secondary data from the project documents, reports and previous studies on hydropower development, the environmental and socio-economic issues prevailing in the project area will be discussed in detail in chapter five and six.

# CH. 4. Research Methodology

## 4.1. Introduction

In every type of empirical research, the fundamental questions that need to be addressed include: 'how do researchers go about the research? What overall strategy was adopted and why? What techniques have been used? And why these techniques were employed? (Yin, 2009; Silverman, 2010). And it is the aim of this chapter to describe these central issues in the context of my research. First, I will describe the research design and how the research was carried out. Then I will give an account of how primary data was collected in the study area, including the challenges and limitations encountered and insights gained during the process. Finally I will expound on the secondary data sources, which for an important component of data used in this thesis.

## 4.2 The research design

The research design entails the 'logical sequence that connects the empirical data to the study's initial research questions and ultimately, to its conclusions' (Yin 2009:26).

This research focuses mainly on actors' involvement in the planning process of the Gibe III hydropower development project, the controversies encountered including local environmental and social problems caused by the project and the perceptions of the local people regarding the construction of the Gibe III dam in their local environment. The research was designed to collect the required data for the study and to analyze it using the research techniques within the domain of qualitative methodology. According to Yin (2009), the research design can be dictated by the nature of the problem to be studied and the research questions a researcher is interested in. The main function of the research design is to set out the logic of inquiry to and explain how the researcher will find answers to the research questions (Kumar 1999). Accordingly, for this study, in-depth interviews and focus group discussions were the major techniques employed. Interviewguides were produced to exploit various views and perceptions on policy issues, local social and environmental issues, public participation and local peoples'

perceptions of the hydropower project in general. Overall, the research design and the method employed are dictated by the question of how to find sufficient data in order to conduct rigorous explanations for the research questions under investigation (Corbin et al 2998, Yin 2009).

## 4.3 The Choice of Methodology

In this study, the use of qualitative methodology is the most appropriate approach for exploring the issues surrounding the Gibe III hydropower project and for answering the research questions posed.

Silverman and many other prominent writers ask a short central question: 'why do qualitative?' (Silverman 2006; Yin 2009; Corbin et. al. 2008; Kvale 1996). The most frequently given response to this question is that 'the research question should dictate the methodological approach that is used to conduct the research' (Corbin et al 2008:12). Corbin et al further argue that qualitative research allows researchers to get at the inner experience of participants, to determine how meanings are formed and to discover rather than test variables.

On the other hand, there is a continuous debate between the natural and social sciences even within the social sciences on the dichotomies between the qualitative and quantitative research methods reflecting the objectivity of qualitative investigations (Kvale 1996). Some social science researchers contend that scientific knowledge should be quantitative and thus the principal methodological tool for acquiring this knowledge should be quantitative as well. They believe that the 'degree to which the observations can be quantified (translated into numbers) is often a good index of the maturity of a science' (Mussen et al 1977, in Kvale 1996:67). According to these perspectives, the prevalence of qualitative research as a tool to generate information is subjective and unrepresentative (ibid). Counter to this view, Kvale (1996) and Silverman (2010) argue that there is no magnified dichotomy between the two philosophies in the sense that 'although quantification is an important tool, large areas of geology, biology, and zoology conduct parts of their research activities based on qualitative descriptions and

interpretations. Kvale contends that a brief look at the actual practice of natural sciences erodes any automatic outlawing of qualitative research as unrepresentative and unscientific.

Kvale, among other qualitative researchers claims that the dichotomy between qualitative and quantitative methods depends on the purpose of the investigation a researcher is interested upon. Kvale argues that both methodologies are research tools and " their utility depends on their power to bear upon the research questions asked, and as tools they require different competencies, with differences among researchers in their abilities to and interests in carrying out quantitative computations or conducting emphatic analysis of qualitative data"(1996:69). Focusing on the choice of research methodology, Silverman underscores that "there are no right and wrong of methods. There are only methods that are appropriate to your research topic" (2010:124). Moreover, researchers have to be able to choose an appropriate methodological approach to investigate a particular research problem (ibid).

Following Silverman's view, and given the research questions in my study, qualitative methods best accommodate my exploration of the perceptions and experiences of local people near the Gilgel Gibe III hydropower project during its development. The involvement of different actors and their views on the hydropower project, the impact of the project on the local environment and the resulting social problems, the overall understanding of the local communities about the positive and negative impacts of the project, etc. is by nature more qualitatively interpretable. Simply speaking, the subjects' perceptions do not lend themselves to quantification. In this case, the result of employing quantitative techniques to test public perceptions and feelings about the project could lead to false conclusions (Kvale 1996). Therefore, the clear conclusion is to use qualitative techniques to collect information through discussion, interviews, and observations.

## 4.4 Selection of the case study area and the respondents

In addition to the Gilgel Gibe III hydropower project, other large-scale hydropower projects were under construction in Ethiopia during the data gathering period of this

thesis, such as the Tana-Beles multipurpose, Tekeze hydropower project, and the Gibe II project. However, the plan and construction process of Gibe III power project was the most contested, if not exaggerated, in the country's history of hydroelectric dam construction. To better understand the issues surrounding this project, it became apparent that it would be valuable to look into broader context of large-scale dam construction and their impacts on local environment and communities. The project covers a large swath of river valley and a mosaic of ethnic groups living around the Gibe basin. Its 150 km length and the relative inaccessibility of the Peasant Associations (PAs), not to mention the limited timeframe in which to visit them made the collection of primary information difficult. The rationale for selecting the Gibe III hydropower project as a case study area is arguably the same basis on which a number of conceptual frameworks have been argued for by many researchers in the field of social sciences (e.g. Kumar 1999, Hancock et al 2005, Yin 2009).

In social science research social phenomena are often studied using a case study method by conducting a thorough analysis of a particular case such as a person, a group, a process, a community or any other section of social life (Kumar 1999, Hancock et al 2005, Yin 2009). All data relevant to the case are gathered and organized in terms of the case. This provides an opportunity for the intensive analysis of many specific details often overlooked by other methods (ibid). This application rests on the assumption that the case being studied is typical of cases of a certain type so that, through intensive analysis; generalizations may be made that will be applicable to other cases (Yin 2009).

As Punch puts it, 'the basic idea associated with case studies as a qualitative approach is that one case (or a small number of cases) will be studied in detail, using whatever methods seem appropriate. While there may be a variety of specific purposes, the general objective is to describe and develop as full an understanding of that case as possible' (Punch 2005, in Silverman 2010:138). Quite rightly, says Silverman, the problem of 'representativeness' is a perennial worry of many qualitative researchers. He posed a question: how do qualitative researchers address the issues of

representativeness? Should we follow purely statistical logic to generalize from cases to populations or to make a study valid and reliable?

One of the answers to these questions suggested by Silverman on how a case study approach can be representative and escape the issues of bias is employing purposive sampling guided by time and resources. As he puts it purposive sampling allows qualitative researchers to choose a unit because it elucidates some feature or process in which the researcher is interested. Similarly, Kumar (1999) contends that in purposive sampling the primary consideration is the judgment of the researcher as to who can provide the best information to achieve the objectives of the study. This type of sampling is extremely useful when a researcher wants to construct a historical reality, describe a phenomenon or develop something about which only a little is known (Kumar 1999). In such cases, purposive sampling demands that those involved in the study think critically about the issue to be studied and choose the sample carefully.

My interest focuses on examining the controversies related with hydropower projects with particular reference to Ethiopia's Gibe III hydropower project. The study area was purposively selected as a case study with the notion that studying controversial issues through the eyes of local peoples gives an impression of their reality for the consideration of decision makers which they can take into account for mitigation of problems caused by the dam.

Selection of respondents was carried out purposively after carefully studying the nature of the project especially of accessibility to the different PAs along the riverbank and conducting a meeting with experts of the Environmental Monitoring Unit at the project site. This helped clarify how I should proceed with interviewee selection taking into consideration the harsh climate along the river bank, transportation facilities to reach the Peasant Associations (PAs), and the proximity of the PAs to the dam site under construction. Finally, Yalo district of Dawro zone in the proximity of the dam site was selected, wherein I chose Addisu Bodere PA as the specific study area. From Addisu Bodere PA, out of 33 farmers identified as affected persons of the project, 8 respondents

were selected for individual interviews, while 10 other people were selected for the focus group discussion.

## 4.5 Sources of Data

### 4.5.1 Interviews

When one employs an interview as the main research technique, the major goal is to describe and understand 'the lived world of the subjects and their relations to it' (Kvale, 1996:29). With this in mind, the goal of the interviews was to understand why and how the controversies around Gibe III hydropower project came into being, as well as to understand and describe the implications of the project on the lives of the local people in the project area. Kvale further notes that 'the interview is theme oriented that the individual persons talk together about a theme that is of interest to both' (1996:29). Here, as a researcher I am interested in investigating the challenges affecting the livelihoods of the respondents and how these local problems were treated by the decision makers. Interview helps to exploit information with uninterrupted descriptions described by the interviewees as precisely as possible what they experience, feel, and how they act (Kvale 1996). Kvale further contends that interviews as a research tool help to focus on "the nuanced descriptions that depict the qualitative diversity, the many differences and varieties of phenomenon experienced by the subjects" (Kvale 1996:32).

Prior to conducting interviews an interview guide was made for the different interviewees, including the the Environmental Protection Authority (EPA), the project office (EEPCO), and the project- affected farmers. These questions are in part posed to me as an interviewer. In this sense the questionnaire guides have in part been used as reminders of the information that needs to be collected and why (Yin 2009). These questions may serve 'as prompts in asking questions during the interview but the main purpose of these questionnaire guide is to keep the researcher on track as data collection proceeds'(Yin 2009:86). The next step consisted of contacting the interviewees according to schedule.

Before travelling to the project site, an interview was conducted with an expert from the Environmental Protection Authority (EPA), and an environmental expert from the project office in Addis Ababa. This interview was useful to have a general overview of the project, including learning the roles that government institutions played during planning and monitoring of environmental impacts around Gibe III hydropower project. Then the next procedure was to travel to the project site, over 300 km. southwest of Addis Ababa to collect firsthand information or what Silverman(2010) calls 'naturally existing information', from the people around the project area.

At the camp site, a discussion was conducted with three experts from the Environmental Monitoring Unit of EEPCO (EMU), as well as an engineer and a geologist at the project site. An informal discussion with the project administrator at the project site was also conducted. The discussion was more concerned with the practical problems during the process of dam construction, complains raised by the local people, how these issues were handled and many other relevant issues around the project development. It was a very important discussion giving more insight into the practical problems during the construction phase of the Gibe III hydropower project. Further, a detailed interview was administered with eight members of Adisu Bodere Peasant Association (PA) of Lome district who complained that they were displaced from their farmland due to the construction of camp sites around the dam.

To meet the farmers entailed walking 45 minutes to the nearby village in Addisu Bodere PA together with my assistant and a guide, and an officer from the EEPCO in harsh around 40 degree Celsius weather, a very challenging situation in itself. The reason why I selected Addisu Bodere PA was that it is within a relatively short distance to walk from the project site, and it is one of the areas highly affected in the current phase of the hydropower project. Other PAs are further away from the project site and inaccessible to motor transport, so in the end these reasons with the extreme heat precluded their consideration for fieldwork.

Addisu Bodere PA again, is the settlement of the local farmers closest the dam construction site and the EEPCO's camp. As mentioned earlier, 8 members of Addisu

Bodere claiming to be affected adversely by the project were specially selected for interview, ranging in age from 25 to 65 years, one of whom was a daily laborer for the project who was laid off due to financial constraints encountered by the project.

### 4.5.2 Focus Group discussions:

A group discussion was conducted with 10 members of Addisu Bodere PA. These members of the PA were purposively selected from a list of farmers obtained from the project document at the project site. These people are part of the project affected communities. Some of them were claimants who lost their farms during the campsite construction while some were affected by the Chida- Sodo road realignment project that crosses the Gibe River directly below the dam and the power house. Two respondents were affected by both of these. Thus the focus group discussion aimed to generate information about the impacts of the dam construction on local people. Of the group respondents, two were women and one of them was divorced with five children to take care of, and her house and the perennial crops on her garden will be demolished due to the realignment road. Moreover, two of these members were employed as day laborers who eventually lost their jobs due to project funding shortages. The mix of respondents proved fruitful, generating substantial information on the dam's impacts on local lives. Some respondents were understandably emotional while explaining their views, reflecting the depth of the problem for them and their families and the implications for their wellbeing in the future.

The discussion provided information to crosscheck additional information from the interviews conducted at the individual level. The focus group responses helped the obtain more information from the participants including their views on the project development in the Gibe Gorge, their expectations from the project, the issues of relocation and compensation, etc.

In both cases a tape recorder was used after getting permission from the farmers. Later, the information was translated from Amharic into English for further organization and analysis. The main problem I experienced while conducting interview was that initially, people considered me a government representative there to solve problems rather than

just to conduct a research. This misconception was settled after I introduced myself and explaining my intentions. Very descriptive discussions followed where the participants explained their views and feelings about various project socio-economic issues relating to the dam project.

### 4.5.3 Secondary data sources

In most research, pre-existing research and information serves as an important source of relevant data which can be readily collected and study by many researchers, without the need of going into the field. This information can be used as sources "to extract the required information for the purpose of the study'' (Kumar 1999:124).

The present study utilized secondary data obtained from different sources. Various publications related to environment, hydropower project management plans, and the ESIA of Gibe III project, were used. The data also involves articles, journals, internet materials and reports about the project. These sources were collected mainly from the EPA, EEPCO- project office and the Gibe III project site, Addis Ababa University, the Central Statistics Authority, the Ministry of Water Resources(MWRD), and finally from NGO's websites.

While using the data obtained from secondary sources, it is important to be aware that the use of information from secondary sources can suffer from personal and institutional bias as these documents may exhibit less rigorousness and objectivity (Kumar 1999, Punch 2005). Be that as it may, the secondary sources have been part of the data used to examine the issues associated with the Gibe III hydropower project.

## 4.6 Organizing the data for analysis

The major task at this stage of the research design is to gather together the ideas and evidences generated from different sources to summarize the findings. As mentioned earlier, I used a recorder in addition to note taking during the focus group and individual interviews. The next step consisted of transcribing the recorded conversation into written text. Writing and organizing the recorded information, although a time-intensive

process is essential for ensuing interpretation (Kvale 1996). The views of the farmers obtained from the interviews and focus group discussions were translated from Amharic into English and were tabulated for analysis (Ch. 5 & 6). Additionally, secondary information such as ESIA documents and NGO critiques of the project were also described. Then this information was descriptively examined to understand how the participation of different actors was anticipated during the planning and implementation of Gibe III hydropower project. This will take us into one of the research questions: To what extent has the planning process of the Gibe III hydropower project been inclusive of the different actors? Once I have examined this issue of access to participation, whether the project owner has an open room for participation of stakeholders or not, then I posed the following research question: how does the involvement or otherwise of an actor in the planning process affect project development? Answering this question will elucidate the main challenges encountered during the construction of Gibe III hydropower dam. And thirdly, the data was made use of to examine how the local people perceive the project in relation to their present and future livelihoods. I believe that this case study can shed light for broader understanding if the data analyzed in chapters 5 and 6 are seen from the perspectives of actor participation in hydropower development projects mentioned in fig. 2.1.

## 4.7 Limitations and challenges

During the fieldwork, especially in developing countries like Ethiopia, research activities usually encounter a number of challenges.

The Gibe III project is controlled by the Ethiopian Electric Power Corporation (EEPCO). As a normal process, I had to get permission from the project director at the head office to have access to secondary data and to conduct interviews with the project officers in Addis Ababa.

To convince the officials at the head office and to proceed further into the project office and then to the project site was the main challenge I encountered. I was told that the topic I chose is a sensitive issue and that it is difficult to get access to information about

the project. The reason according to the officials is that the restriction came into effect after the foreign mass media, the BBC team, visited the site and reported controversial information to the public. Therefore, it was very difficult to build trust between me as a researcher and the officials in EEPCO as information sources. After a detailed explanation of the purpose of my research, the ethics of research, and that the information I will collect is merely for academic purposes, I got the permission from the project director to get access to the project office and the project site. I then conducted an interview with two experts from the project office in Addis and then traveled to the project site, over 300 km. southwest of Addis Ababa.

The second field experience was the problem of transportation logistics and difficult local climate and topography of the study area. I had to rent a car from Addis Ababa to travel to the project site since there is no other means of transport to the project site and if any, it not allowed without permission from the EEPCO main office.

The project is located in a deep gorge dangerous to drive in, with high relative humidity and sweltering temperatures usually reaching around 40 degree Celsius. A number of project site camps are constructed along the river banks, named the "right wing" camp and the "left camp". The employees dubbed one of the camps at the "left wing" "Darfur", due to its boiling temperatures, reminiscent of the place in Sudan of the same name. To meet the respondents from the selected PA, I had to walk 45 minutes to the village in Addisu Bodere PA. This however was a difficult feat, considering I had travelled from a cold temperate climate to walk in rugged topography and in 40+ degree Celsius weather.

The challenges I mentioned help illustrate two lessons for field excursions: Although themes such as the controversial issues of hydropower projects can be inspiring issues to study, it is important to investigate whether the necessary data can be obtained without bureaucratic bottlenecks. It is also important to have sufficient information on whether the project site has access to transportation infrastructure and health facilities, and if it is possible to get weather information, etc. These limitations can affect the depth and breadth of information that can be generated from field and crucial secondary sources.

The other limitation encountered was the problem of contacting members of the environmental NGOs critical to the Gibe III hydroelectric dam as a failed dam project. These organizations are not available in the country and it was difficult to meet them and discuss with them the issues related to the Gibe III hydropower project. Instead, I used secondary data sources retrieved from their homepages on the internet.

With such challenges, however, I believe that I have collected sufficient and relevant data from different sources and furthermore that I conducted interesting interviews and focus group discussions with some members of the local people from Addisu Bodere Peasant Association (PA). These members are individuals who claim that they were displaced from their farms and grazing areas during the construction of the project camp sites around the dam area. In general the field work was a good opportunity to learn more about people's experiences through discussions and interviews, which helped enormously to better understand the nuances of their views and perceptions surrounding the issues related to the Gilgel Gibe III hydropower project.

# CH. 5. Exploring Gilgel Gibe III Hydropower project

In Chapter 2, I presented a literature review on renewable energy and the rationale for creating research and policy programs to exploit these resources. More specifically, I discussed hydroelectric power as a subset of renewable energy resources gaining major policy attention in developing countries, including the controversies and actors in conflict surrounding this resource. In this section, I will focus on the causes of major controversies and the pertinent challenges influencing hydropower development projects through the particular case of the Gilgel Gibe-III hydropower project in Ethiopia.

As mentioned in chapter two, hydropower is an important renewable resource that has been utilized as a source of electricity for a long period of time. Furthermore, this resource has been harnessed to meet the energy demands for economic growth, which all too often ignore the major social and environmental impacts of large-scale hydroelectric dams. Moreover, the literature review reveals that major criticism emerged from the marginalization of the social and environmental impacts of large-scale hydropower development projects.

## 5.1 Participation during the project planning

The most influential philosophy guiding the planning of hydropower projects has been a top down approach with technocratic expertise governing the framing and implementation of project development (Frey et al 2002, Sternberg 2008). The question of who should participate in the project planning and implementation is a central issue that has to be resolved in the first place.

The notion that has been learned from a number of studies on power projects is that the planning and implementation process of hydropower projects has to include government institutions, groups, organizations, communities, etc., of diverse ideas, skills, and experiences (Frey et al 2002, IHA, 2003, Sternberg 2008).

Local communities whose livelihoods, cultural values and social relations is affected by hydropower dams can have inspiring views and ideas that can invigorate the project

planning process. And, development and business organizations who have the financial capacity to support the construction of hydropower projects can share their experiences on how the planning process should be designed to meet the required principles. And, social anthropologists, ecologists, etc., can constructively share their knowledge on the social, cultural and biodiversity of the local area. The idea is that the collective skills, ideas and learned experiences of these stakeholders has substantial positive contribution for the project development.

In Ethiopia's hydropower sector policy, it is stated that: the policy encourages involvement of private sector in the development of hydropower, subject hydropower development schemes to strict environmental and stakeholder consideration as well as meeting economic criteria (MWRD 1999). However the controversies and the resultant challenges faced by the Gibe III project have been emerged as these policy objectives were not implemented as they should be.

Coming to the project planning of Gigel Gibe-III, as a public enterprise, it is a government owned company run by the Ethiopian Electric Power Corporation (EEPCO). As illustrated in Figure 2. 1, the project planning process has to include multispectral actors. The diagram demonstrates that when involvement of each actor progresses toward the center of the diagram it would imply that the project host country creates a favorable investment climate by creating adequate institutional and regulatory frameworks. Moreover, there will be a room to conduct a fair decision process for impact management to optimize positive effects while minimizing negative setbacks, and thirdly, these two conditions can be preconditions to secure financing the project. This section will shed light on these main points in relation to the Gibe III HP project.

## 5.2. Institutional challenges: examining EEPCO's capacity

As illustrated in Figure 2.1, under the host country, governmental agencies like the EEPCO are the functional actors within the domain of the country's national energy policy. Its role on the Gibe-III power project and in the electric energy sector in general involves the production, transformation, distribution and commercialization of

hydroelectric power. The construction of all hydropower projects in the country is controlled by this public institute.

Among other requirements, EEPCO must possess a well organized and skilled staff, have a clear mandate and well organized and transparent information system. Moreover, EEPCO must develop regular relationships with line government offices that can have positive contributions to the project efficacy. In terms of manpower, Out of 11293 employees only 1026 and 104 of them have first and second degree education respectively[8], which is not more than 10 percent of the total employees in the company. All but few of them that were recruited recently in hydropower projects have an engineering background. The sector has lack of skilled man-power, and lack of transparency and more bureaucratic structure to get access for information.

### 5.2.1 The issue of transparency: access to information

Transparency is widely regarded as an important precondition for implementing development planning. The idea is that if an institution is transparent, the major factors affecting the development process becomes perceptible. Failure to acknowledge the main hindrances challenging the implementability of the projects under EEPCOs mandate can possibly make the institution accountable.

The openness of EEPCO toward the public and particularly to the major actors including the local people could have a paramount importance to the project's credibility. Researchers, mass-media, and other interested groups or individuals must have access to reliable and timely information on the project so that it would be possible to assess the project's present and future economic, social and environmental implications.

For Gilgel Gibe III project, one cannot say that it has been of greater visibility to the public. There is no frequent public discussion in mass-media about the project and its progress as well as its positive and negative impacts. EEPCO is not open for any public comments and critiques and as indicated in chapter 1, I should have to stay at the head

[8] http://www.eepco.gov.et/eepco.php

office in Addis Ababa for about two weeks to get permission to travel to the project area for data collection.

According to one of the experts in EEPCO, in early 2009, a group of journalists from the BBC were visiting the project and had a discussion with the local people at the down stream areas. The BBC later reported on the convictions of the people regarding the impact of the project on their future living conditions. The team's report had two implications. First EEPCO became less transparent and more reluctant in reveling information about the project. For Gibe III hydroelectric project, one has to get permission from the general manager to get access for information. Secondly, according to the expert, the BBC's report about the project had deterred decision makers from being passive about the project and its impact on the local people. Although the passiveness of the company was an observation by the expert before the BBC's report, there has not been marked observation that EEPCO became more active afterwards when it comes to the issues of local community and the local biodiversity around Gibe III hydroelectric dam.

Gibe III is the project is a public project and individuals, groups, researchers; the project affected local people must have the right to get access for information. Moreover views, perceptions, and comments about the project are important to the project development itself. Process errors that have not been clear to the project owner can be traced by others. Suggestions about the process of environmental and social impact assessments and the planned mitigation measures can be inputs to improve quality of the project document. Therefore, openness of the project for field visits, access to information and incorporation of substantial feedbacks into the project document is quite important to realize the alleged benefits of relations between EEPCO, the project-affected people and governmental institutions.

### 5.2.2 EEPCO's Relations with pertinent institutions

One of the central challenges facing EEPCO is to function as a responsible public institute and become structurally and functionally interrelated with other government institutions during the planning and implementation of the hydropower projects. It can generally be said that EEPCO's relationship with government institutions such as the Environmental Protection Authority (EPA), Ministry of Health (MOH), and Forest and Wildlife Authorities, etc, can positively or negatively affect the quality of the project planning. Rhetorically, the project's ESIA document indicates that experts of different background have participated in the environmental and social impact assessment of the project which was conducted by an independent private consultant. However, as experts in the EPA point out, EEPCO's contact with other development offices has been minimal. Projects were predominantly monitored by the Ministry of Mining and Energy, and EEPCO. It can be said that the relaxed contacts between the EEPCO and EPA was one of the factors that prompted criticism by the international NGOs. One of the main controversial critics debated by these NGOs is that the government has violated its own national environmental regulations by conducting the ESIA after the project construction was begun by the contractor in 2006 (Ch.2).

As a large-scale hydropower project, the Gibe-III hydropower is a complex affair that should involve participation of a cross-section of interest groups in the project planning process. The planning process should not be considered as a mere responsibility of the project owner alone. It must be underscored that responsible institutions at federal, regional, zonal and local levels have to be involved in the decision making process. For example, the issues on local biodiversity involves ecologists, the health issues in the area needs professionals from the MoH, and studying the social impacts of the project needs experts from social sciences, etc.

Pretentiously, it appears that many groups participate in the planning process of the Gibe III project. However, as one digs deeper, it becomes apparent that power within this sector is highly centralized, excluding pertinent internal and external organizations from the decision making process. As I mentioned in the historical background of

Ethiopia's electric sector, EEPCO has witnessed a slow process of institutional development with a distinctive feature of centralized and non-participatory forms of planning. There was no culture of consultation with government institutions, project-affected people, and Non-Governmental Organizations. EEPCO's and other institutions' role has been dominated by the nature of the country's political system. The previous political system had a strong influence limiting institutional relations and their capacities to coordinate hydropower planning and development projects independently. It might be worthy to mention some of my experiences during the fieldwork in Ethiopia to illustrate the tightness of EEPCO. At the beginning of the field work the first task was to visit some specific offices and ask on how I can retrieve secondary source of data. Addis Ababa University, EPA, and the project office, were some of the target areas that I paid a visit to get information on how I get access for information about the Gibe III hydropower project.

The response from the Faculty of Social Sciences of the Addis Ababa University was resoundingly: "it is a sensitive issue and is difficult to get information from EEPCO as such". Interestingly, I received a similar response at EPA, MWRD, and the Gibe III project office itself (see Ch. 1). Importantly, from outsider's view, there is a perception that hydropower development is a sole concern of EEPCO, and professionally an accomplishment of engineers. This misconception can lead to less involvement of social science researchers in the field. Moreover, the willingness of the project owner to augment the project document through multispectral views is hampered by the bureaucratic system.

There is no frequent and broad-based spectrum of discussion on the social and environmental impacts of the project. The implication is that less institutional and academic participation in the process of project planning can affect the quality of the project document which eventually outweighs the negative social and environmental impacts.

In the Gibe III project, and more generally the relational aspect of EEPCO with other institutions, it is possible to infer two contrasting points. On the EEPCO side there is

abysmal thinking that it is the sector's mandate to run the Gibe III project development (as stipulated by policy). And thus the academia and other interested researchers refrain themselves from researching, commenting, and criticizing the project.

Both have negative impacts on the project. The input of different ideas especially from the academic and research community is lacking. In practice, the views, new ideas, and criticisms presented by academic and research groups would make project planning and implementation more rigorous, and disagreements between interest groups could be minimized, mitigation majors would be sustainable when the project owner incorporate new ideas into the project planning and implementation. However, the institutional role of the hydroelectric energy planning and production in the country is by large dominated by EEPCO, allowing little involvement of other public and private national or international investors. Gibe III hydropower project has been strongly criticized for its lack of a wider and more permissive involvement of stakeholders including a number of affected communities near the Gibe III dam.

For large-scale hydroelectric dams like the Gibe III, where stakeholders such as international NGOs, financing institutions and local people are claiming excluded parcels, it would be incorrect to say that the project was not distancing itself from the discourses of participatory approach. The ESIA documents might indicate that it has been inclusive and transparent during the process of planning and construction of the project. However, upon a thorough examination of the projects decision process it becomes apparent that the construction the dam- in the eyes of the international principles of hydropower project development as well as from the issues that have been raised by some of the local people around the dam area, was generally non-transparent and less inclusive. International NGOs criticize the government asserting that that the ESIA was performed after construction of the Gibe III dam begun in 2006.

To verify whether a prior consultation and a repeated discussion with the local people in the project area were conducted fairly, I presented this question to respondents in Addisu Bodere PA during a short focus group discussion. Pertaining to the camp site construction at the dam site they described that the camping site was selected based on

the proximity of the area to the dam site and no consultation was conducted with the local people and no compensation was considered.

### 5.2.3 The International Organizations

As seen in Figure 2.1, the other actors in the cluster include the international organizations such as the World Bank, African Development Bank, European Investment Bank, international NGOs, etc. These organizations each posses certain regulations designed to address the major environmental and social issues surrounding hydropower development projects. A number of studies suggest that these principles were developed following the failure of several large-scale hydropower projects to address the problems associated with the local environment and local communities (Barrow 2000, WCD 2000, and Holder 2004). As a result, a number of NGOs, commissions and departments were established and have campaigned against big power dam constructions in developing countries.

The most active environmental watchdogs of the Gibe-III hydropower project include the International Rivers Network, the Friends of Lake Turkana, and Survival International. According to Survival International's report on the Gibe III project, the project is considered as one of the failed projects in Africa (see Ch.2). Although one might argue that it is a premature judgment and conclusion to reflect as a failed project right at the start of construction, these opponents argue that the project will adversely impact the water level and biodiversity of lake Turkana as well as the people living downstream of the project especially on the Kenyan side. In fact these organizations have overlooked two main points: first, according to their suits presented to financing organizations including the AfDB, EIB, their major concern reflects about the biodiversity of Lake Turkana and the local people around the Kenyan side of the lake, while majority, over 200,000 of the people live on the Ethiopian side of the lake along the lower Omo valley. Secondly, as reflected in their documents[9], these organizations have been focusing mainly on the downstream populations giving less coverage for the

[9] *SC.AfDB_**directors**_9.4.09.pdf (this is an appeal sent to the board of directors- AfDB, 9 April 2009 by Survival International).20.Oct.2010.*

people that will be relocated above the dam site. But the first victims of any hydropower projects are those people that will be evacuated from the reservoir area.

With regard to the issue of participation and public debate about Gibe III project, referring the USAID's field report, one of the opponents, Anthony Mitchell states that public debate in Ethiopia about Gibe III had been limited by political conditions in the country. The political environment discourages public discourse on development issues including both energy policy and projects to implement the policy (Anthony Mitchell, June 2009).[10]

Following the suits of these NGOs, how the financing organizations and the borrowing country, Ethiopia, responded to the frequent plea is important to mention. To examine these controversies it will be worthy to illustrate a short summary of the level of participation of various organizations during the planning and construction process of the Gibe III hydropower project.

Table 5.1, summarizes the conditions during the planning process of the Gibe-III hydropower project. This summary highlights the roles played by different governmental and non-governmental institutions during the project development process. Parts of this information were collected from a face-to-face interview of experts and local people around the dam. The views of international NGOs have been summarized from secondary sources.

[10] http://anthonymitchellblog.blogspot.com/2009/06/gibe-iii-dam-heralds-climate-change.html (20. 12.2009)

Table 5.1 Summary of the roles and level of participation of actors during the planning process of Gilgel Gibe III HEP

| **Participant** | **main role** | **remark** |
|---|---|---|
| The EPA | environmental monitoring and evaluation | Participation not as it should be. Have a lose contact with EEPCO |
| MME | policy, regulation and control | high mandate before 2005 |
| EEPCO | project planning, follow-up, Management, etc | Dominant project owner, frequent contact with the contractor company |
| The contractor (Salini Constrattori, Italy) | Dam construction | NGOs claim that the project contract was awarded without competitive bids(WB's requirement) |
| The local people | Sharing their perceptions about the project development, discussing about their livelihood, and their local environment, future benefits of the project, etc. | Discussion was not regular and NGOs claim that these discussions were done after the contractor began construction in 2006,<br>-Some of them explained that they are excluded from compensation. |
| International NGOs<br>IRA, Friends of Lake Turkana, etc. | -Demand access to participate in the project impact assessment | -had not access to participate<br>-appealed to halt Gibe-III project |
| -WB,EIB,AfDB,etc. | Financing the project | -The Bank's requirements were not respected, e.g. the contractual agreement with Salini,<br>- high pressure from international NGOs , financing the dam construction halted |

Source: summarized from interviews and secondary data reviews.

Table 5.1 illustrates principal issues that can be examined from the points of view labeled in Figure 2.1. The case of the Gibe-III hydroelectric power project is an illustrative issue on how the major actors can either be on positive tracks of agreements leading to the procession of the construction process, or to the point of disagreement leading to complaints on the credibility of the project documents, and consequent appeals to halt power project. One can argue that the overall participation was confined leading to disagreement among stakeholders. Although the project owner-EEPCO might assert that it has effectively included the affected populations as actors, the process of ESIA as claimed by some local community members and international NGOs, was conducted un-procedurally and inappropriately(Survival International 2009).
The contacts between actors can be categorized systematically from Table 5.1 as 'optimal' or 'controversial'. While the major role of governmental institutions other than EEPCO was on policy formulation and monitoring and evaluation activities, the remaining dominance was entrusted to the EEPCO as a project owner. This can in part be a normal process as there has to be a private or a public sector that must follow the project, and the problem might not be on who follow up the project. The problem however is how efficient, and transparent is the institute to accommodate the stakeholders in accordance to the national and international regulations. One of the subjects that the project owner has strongly been criticized was on the provision of the project contract. The project contract was decisively awarded to Salini Construttori without international competitive bids.

On the other hand, those who strongly oppose the development of hydropower projects violating international standards have influential voices in the face of international development and financing organizations including the WB, EIB and AfDB. The environmental policies of these multilateral financing organizations are based on the principles set by the World Commission on Dams. Often, the environmental NGOs put strong pressure on these financiers to respect their internal policies to finance hydropower projects in developing countries.

The general controversy between the project owner, EEPCO, and the environmentalists is therefore a conflict of procedural issues with the environmentalists claiming that the environmental and social impact assessments as well as the contractual bidding processes of the project construction were not conducted according to international standards. The full participation of stakeholders can create an ideal platform to make the implementation of a project plan optimal. When international procedures such as full participation of stakeholders, participatory ESIAs, of large-scale hydropower development projects are not followed, NGOs' pressure on multilateral and bilateral financing organizations become stronger (Linaweaver 2002), as is the case of Gibe III project, and a possible withdrawal of financial support for such projects can ultimately affect the project development both temporally and financially.

### 5.2.4 The procedural issues as impediments

As mentioned in the literature review, there is a great importance placed on the participation of various interest groups in hydropower development. It is set as a requisite for large-scale hydroelectric projects to be participative in order to have viable financial support from multinational organizations such as the WB. Meeting the major requirements set by international development organizations and nations that finance power projects in developing countries will rid the project of controversies and, encourage financial support as well as a completion of the project as scheduled.

AS seen in Table 2.1 during the project planning process, there are certain decision stages that need to be considered by decision makers. One of these key decision stages that the Gibe-III project preparation needs to meet is the verification that EEPCO secures full agreements of the major actors including the international project financiers before tender of the construction contract is awarded. A project contract had to be transparently announced and tenders had to be floated to invite potential and competitive construction companies. Moreover, the major actors as seen in Figure 2.1 need to have access to share their views regarding the project's present and potential impacts and its mitigation measures.

As mentioned in table 5.1, the international NGOs debate that Gibe-III project contract was conducted on a bilateral basis between the government of Ethiopia and the Italian based construction company, Salini Construttori, without competitive bidding (a procedural requirement endorsed by the World Bank). EEPCO has been vilified for not following the international principles that should be considered during hydropower project development. This criticism has its own implications on the project development.

The overall repercussion can generally be explained in terms of finance, time-laps and the relationships between actors. Financially, the multilateral organizations including the WB, EIB and AfDB, are among the most powerful financial institutions that traditionally fund development projects in developing countries. This tradition has been strongly criticized by a number of environmental NGOs claiming that hydropower projects in developing countries are failed development interventions causing environmental and social destruction. In its official letter written to the directors of the AfDB, an international NGO-Survival International stated:

*"if the Directors (AfDB), approve the Gibe III application before they have properly investigate our allegations, they may place the Bank in breach of clause 2.5 of its own environmental and social assessment procedures"(Survival International 2009:1)*

Article 2.5 of the Bank states that: "*the projects financed by the Bank shall comply with the Regional member country's environmental and social legislations, policies and guidelines and with local and national requirements on public consultations and disclosure*" (ibid: pp. 1).

These messages enforce the project financiers to comply consistently with their internal principles mirroring the importance of environmental and social legislations, policies and guidelines. This appeal against the project can be an indication that the international financial organizations including the World Bank and AfDB have been experiencing strong pressure from international NGOs not to support Gibe-III and other multipurpose dam projects in developing countries unless they are consistent with the international requirements. Some possible effects can be mentioned on the relationships between the

financing organizations (the WB, EiB and AfDB), the international NGOs, and the borrowing country (the government of Ethiopia).

Opponents of hydropower dam projects remind the banks that approval of the project's application will degrade the reputation of the financing institutions. From the perspective of the borrowing government, if multilateral financing organizations neglect to support development projects such as Gibe-III, they are implicated as refusing to support projects that seek to promote basic human necessities such as food, electricity, healthcare and education. Therefore, the pressure on multilateral financing organizations is two sided emanating from those proponents that view hydroelectric energy from national development perspective and the opponents that criticize hydroelectric dams as ecologically destructive structures.

Furthermore, from the perspectives of the borrowing country, there are certain implications on the World Bank which should not be overlooked. Prime Minister of Ethiopia, Meles Zenawi has stated that the World Bank must take the accountability for any delay of the completion of Gibe III project. But the dam will be completed 'at any cost'[11]. This in part envisages that the completion of the project due to financial constraints can significantly be delayed. The outcome of this controversy can be generalized into two major points. First in addition to the Bank's internal principles, the NGOs' pleas have been successful in a sense that the WB, EIB and the AfDB have all withdrawn from financing the construction phase of Gibe III dam. Conversely, despite withdrawals from financing the project, the measures taken by these organizations did not stop the project construction.

The pressure by NGOs on the WB and other multinational financiers can undermine their role as supporters of large-scale hydropower projects in developing countries. The implication is that countries that acknowledge hydropower as a source of modern electric energy solicit financial aid from bilateral financiers. As a result the principles that stipulate participation of major actors in hydroelectric project planning can further

[11] 3http://www.newbusinessethiopia.com 'Meles Vows to Complete Gibe III Dam at Any Cost'. 20, October 2010

be violated. This has been the case in Gibe III. When the Government of Ethiopia lost support from international financing agencies such as the WB, AfDB and EIB to complete the Gibe III project, it solicited financial support from the International Commercial Bank of China (ICBC). The ICBC ultimately agreed to 500 million USD to support the completion of the electromechanical portion of the project. The funding of this portion of the project was promised by the EIB. This weakens the role of multilateral financing organizations as major supporter of development projects, and undermines the trust of borrowing countries on major financing institutes.

The general conclusion ascertained from these points is that the financing organizations may cease funding the construction of large-scale hydropower projects such as the Gibe III of Ethiopia. Such decisions might be welcomed by opponents of dam construction who argue that large-scale dams as environmentally destructive. However, Gibe III hydropower project has been continuing construction without support from big financial organizations. Thus, when the project owners have not taken similar decision to stop construction of large-scale dams, the ultimate objective of the NGOs is unmet as the social and environmental impacts will continue to exist as long as the dam is under construction. It is possible to argue that the more a project delayed the more will be its social and environmental impacts. It may also cost the country more money than the project's initial construction cost.

Due to its complex nature, the procedural issues will remain the most challenging issues that large-scale hydropower projects like the Gibe III will face. In particular, it remains challenging to bring into optimal position those that perceive hydropower as engine for socio-economic development and those who view hydropower as destructive to biodiversity and local communities. As can be understood from Gibe III hydroelectric project, while the NGOs perceive the project as a failed project, the project owner perceive the NGOs' view as subversive action.

# CH. 6. Hydropower, Environment and the Local Communities

This part of the thesis will examine the main issues related to the Gibe III HPP and its impact on the local environment and the communities within the project area. It will also focus on how the local people perceive the construction of a large-scale hydropower dam in the area.

## 6.1 Gilgel Gibe-III and the local environment

Hydropower utilizes nonpolluting and locally available resources. Since hydropower generates electricity with no direct by-products or pollutants it can have remarkable role in climate change mitigation. Politicians in many developing countries use this concept as a tool to promote the development of hydropower projects in their respective countries. With that said the general notion of hydropower as a renewable and environmentally friendly energy resource can overshadow the effects of hydropower projects on local environment.

The controversies arise at local level as there are associated, and often unavoidable social and environmental impacts of large-scale dam projects. Within the 211 square km of reservoir, variety of indigenous trees used locally as herbal medicines will be submerged, large area of wildlife habitats can be destroyed, and a number of wildlife species can be enforced to migrate. Therefore, it is important to stress on the ecological footprint that will be created by the Gibe III hydropower project since it has a significant negative impact on the local environment.

The Gibe III project area is a home to a rich eco-system containing wide variety of plants and wildlife. This project area is also a home to multitude of valuable resources used by many indigenous communities as herbal medicine, firewood and construction materials, traditional honey production, a grazing area, a salty soil bed used for traditional livestock fattening, and a natural hot spring used for traditional healing. The Environmental and social impact assessment (ESIA) study indicates that the Gibe III

hydropower project has a minor environmental impact. On the other hand, the local people around the project area explain their concern about the impact of the project on the local environment, and the resulting impacts on security and livelihoods of communities affected by the project.

In this section, I will focus on two major issues: the impact of the project on the local biodiversity as a home for various wildlife species, and whether or not the proposed mitigation measure of developing a buffer zone, is a sustainable solution to protect the human and wildlife population living along the vicinity of the Gibe valley. My argument is that, when part of the habitat is submerged by water there will be a resource conflict between wild-life within the congested zone, and a conflict between wildlife and the adjacent settlers. This can lead to migration or extinction of wildlife unless decision makers take a measure that can support the local people's livelihoods, including better sources of food, energy, housing, grazing land, modern and accessible road networks. The modern road networks can facilitate local trade between the tribes and some urban centers in the vicinity.

The Gibe-III project, as a large-scale power project, is characterized by a change in land-use land cover. A total area of 211 square kilometers of terrestrial landscape will be covered by water forming an artificial lake 150 km long, inundating a large area of vegetation home to a large variety of wild life, including lions, monkeys, and warthogs. Inundation of eco-rich regions within the Give valley dramatically changes the landscape altering the physical habitat and biotic composition of the area. The project will affect the distribution, abundance and diversity of the wildlife. With the change of the terrestrial area into an artificial lake, the impacts of the local communities on their surrounding environment will be more intensive.

As mentioned in chapter 3 of this thesis, the height of Gibe III dam is 240 meters resting at a foundation of 650 meters above sea level. This could dramatically affect the entire habitat within a range of 890 meters a.s.l. and an area of 211square kilometers will be covered by an artificial lake which will push wildlife towards the buffer zone and more often to local residences near the river banks. As was claimed by the local people, the

disturbance of the local environment and flooding of wildlife habitats will cause a tremendous attack on human and domestic animals. Local people have already been attacked for a long period of time especially during dry seasons when there is a marked decline of prey. Therefore, inundation of large areas along the Gibe valley will aggravate the situation even with mitigation measures sought by the project owner.

In order to assess the wildlife resources of the project area, secondary data sources have been reviewed. These sources show that wildlife experts have collected information about the types of wild life native to the affected area by interviewing residents. According to the study the project area serves as a habitat for a mosaic of wildlife such as antelopes, bushbucks, baboons, leopard, hyena, warthog, lion and many other species (EEPCO, 2009). A large portion of this habitat will be submerged under water. Based on this information, the argument that the project will have no adverse environmental and social impacts on the surrounding area, as stated by experts from EEPCO, lacks validity.

### 6.1.1. Forming buffer zone as mitigation measure: is it a sustainable solution?

The central purpose of buffering an area is to make a particular geographic location as neutral as possible between two or more hostile or belligerent forces to avoid conflict. In the Gibe III case, the establishment of buffer area limits the encroachment of human settlers towards the buffer zone. It often can restrict the use of firewood, construction materials and other local resources that the people have been using before. The livelihood of the people in some of the adjacent districts, including many PAs in the Soro Wereda is based on an agro-pastoralist farming system, mainly livestock rearing (EEPCO 2009).

Table 6.1 demonstrates that the project will affect 11 districts. More than 50 percent of the total buffer area will be demarcated along three weredas: Gena Bosa Soro and Omo Nada. The Hadiya herders in Soro used to cross seasonally to Omonada, Gena Bosa and other areas in the Dawro zone to search for grazing land. As indicated in Table 6.2, the wild life that inhabits the affected area of 20,000 hectares will migrate to the demarcated

buffer zone. Although is it theoretically assumed that the 50,000 hectare buffer zone will promote a reduction in soil erosion and enrich biodiversity, the area is known for a high population density and traditionally exploited as a source of livelihoods. Therefore, how the buffer area will protect and maintain the biodiversity remains a challenging question that requires a more detailed study.

**Table 6.1** Project-affected woodland and riverine forest and proposed buffer area.

| Name of affected district | Affected area(ha) | Proposed buffer area(ha) |
|---|---|---|
| Kindo Didaye | 1,649 | 1,904 |
| Kindo Koysha | 3,463 | 5,524 |
| Boloso Sore | 1,297 | 3,216 |
| Loma | 3,675 | 6,346 |
| Gena Bosa | 4,430 | 10,110 |
| Kach Bira | 1,13 | 232 |
| Omo Sheleko | 1,369 | 3,544 |
| Soro | 1,718 | 9,183 |
| Gibe | 61 | 948 |
| Omonada | 2,010 | 6,959 |
| Yem | 215 | 2,034 |
| Total | 20,000 | 50,000 |

Source: EEPCO 2009

The project area possesses tremendous importance to the local people inhabiting the riverbanks. It is source of herbal medicines, traditional apiculture, and most often the Hadiya tribes cross the river for local market, and seasonal grazing for livestock. In the project area, especially in the upper part of the river bank around Soro wereda and adjacent areas, some rural communities live few meters away from the gorge. For

example, in two local areas known as Sangana, and Hadero(Bombe farmers association), within a distance of 200 meters one can reach the gorge of the Omo-Gibe river, which is a suitable habitat for a number of species of mammals antelopes, hippopotamus, and carnivores such as hyenas, leopard and lions (EEPCO 2009). Part of this area will be submerged by the artificial lake forcing the wildlife to leave the area. Thus the local environment will be subjected to more environmental stress for two major reasons: First, the local food chain will be dramatically disturbed causing some species to become extinct or migrate into other locations. Secondly, in the area that will be flooded, there are already existing conflicts between carnivores animals and the local people whose livestock are often prayed on- a case which will intensify with the damming of the river due to constrained habitat for the wildlife. This conflict was clearly explained during a local in a meeting conducted in the Soro district between the Midday International Consultation Engineers and the district leadership:

*"In the PAs located along the Gibe River, lions usually kill human and livestock causing many deaths within a few years. Therefore due to the Gibe III project if the water volume is increasing, the wildlife will come to residential areas and attack the local people and their livestock''* (EEPCO 2009: 215, translated from Amharic).

*"The people in the area get construction materials from the vicinity of the river banks. The increase in volume of the water will cause a shortage of these construction materials"* (ibid: 215)

It is under such circumstances that the creation of buffer zones has been recommended as a mitigation measure to protect the area from human induced degradation of biodiversity. However, the issue has more challenging dimension. The survival of the wildlife in the buffer zone will be compromised as it is squeezed between the reservoir and human settlements. Moreover, the local people all along the valley will be forced to adopt into an intensive land use practices as parts of the local and traditional resources will be inundated. More importantly, the wildlife will have a congested living space and this can cause an increased attack on local people. Furthermore, the buffer zone may not deter the people from using these forest areas as they have no alternative construction

materials, and energy sources. It is difficult to force them not to use these local resources and they would not stop even if they are enforced not to do so. Enforcing regulations that prohibit people from using the resource that has been used traditionally for years is very challenging.

Arguably, one can say that hydropower is renewable, environmental-friendly and economically useful. However, the general concept of renewability should not lead decision makers to overlook the adverse impacts of large-scale energy projects on local environment. The beneficiation of the project-affected community from the Gibe III project such as income generation from fishery and tourism, rural electrification, modern rural-urban transport and communication, and improved animal husbandry can be a better solution to mitigate environmental stress around the project than a buffer zone.

## 6.2 The Social Dimension: Gibe III and the local community

What social impacts will the project? As mentioned in chapter 3, the major livelihood of the people around the project area is mixed agriculture. In the upper part of the river, in Soro wereda, the Hadiya tribes practice semi-pastoral activities with large livestock population. At the dam site the areas are relatively high populated areas where agricultural practices are predominantly sources of food supplemented by root crops, mangos, avocado, banana, ensets and coffee.

The inhabitants on both sides of the river have regular relationships crossing the river using two major means: Few Kilometers above the dam site, there is a modern crossing bridge where transportation is regularly available to connect the Wolayta zone and the Dawro zones. This historical bridge will be submerged by the artificial lake and a new bridge is already constructed below the dam site to connect the zonal towns of Chida in Dawro and Sodo in Wolayta zones. In the upper part of the project, in Hadiya zone there are more than five traditional crossing points. For example according to the Soro wereda administration, there is a traditional market center called ‘Jujura’ on the eastern side of the project and on the other side of the river in Omo-Nada wereda which operates on

Saturdays called the ‘Nada’. These two small areas are located in two different zones in each side of the river. The people in the Hadiya zone interact with the inhabitants of the Omo-Nada, and Yem weredas by crossing the river at different points such as ‘Soro Geta, Lelecho, Ababiya’ among other crossing points (EEPCO 2009). The people cross the Gibe River for two main reasons: market interaction and in search of seasonal grazing area especially by the Hadiya tribes that cross into the other side of the river to Omo-Nada and Yem districts. These tribes have a shortage of grazing area and they cross often to the neighboring districts on the other side of the river. This raises the question of what impact will Gibe III project have on the inhabitants and their livelihoods if they are no longer able to cross the river as they have traditionally been practicing.

### 6.2.1 Disconnecting the Connected: Inundation and Relational Geography

The impact as explained by local administrations such as the Soro wereda and some people from the Peasant Associations (PAs) during discussions with the consultant, MiD-Day International, a private company hired by EEPCO, is significant. It is clearly evident that the local population has a direct and indirect dependence on the local environment from which an important part of their livelihoods are obtained. The relationship between the local communities is inter-tribal and inter-spatial spanning both banks of the Gibe River through the exchanging agricultural products and livestock as well as the need to use the river banks as seasonal grazing areas. The economic and social interrelations between the people on both sides of the river have prevailed for a long period of time. However, the reservoir will profoundly affect the communities in the region as the mobility across the river to conduct commerce and sustain livelihoods is impacted. The major issues surrounding the introduction of big reservoir in this region were raised during a meeting between the local administrative bodies in Soro district and the consulting firm Mid-Day International:

"*The pastoralists in Hadiya tribe that often cross the river in search of grazing area and the regular traditional markets between the communities residing on both sides of the river will perpetually be interrupted"(*EEPCO 2009:214, translated from Amharic).

The statement succinctly expresses that the introduction of an artificial lake will severely impact the economic survival of the communities by interrupting mobility of the people across the river. Moreover, if alternative mitigation measures are not in place, the interruption of the fabric of society interwoven by various ethnic groups having social and economic relationships will have a strong negative impact on the people.

Mitigation measures suggested by the consulting firm, Mid-Day International, include the construction of a bridge to cross the reservoir, and to use boats to transport the people. There are inherent technological challenges in this proposal, considering that the higher the volume of the area occupied by water, the longer the bridge must be to connect the river banks. Moreover, it is pointed out that the areas below 890 meters above sea level will be submerged. The bridge has to be lined over this altitude. It can be possible technically but is challenging in practice as it will be costly and technically difficult. The other measure, using a boat as a means of transportation, can possibly be a better solution partly as it can be used to transport the people and their marketable goods. However, it will still be problematic to amass large quantities of livestock which usually accustomed to grazing areas across the river banks. The area is known for wide range of livestock population. Provided that these herders have to cross the river at certain period of the year to look for pasture areas, it is practically difficult to use boats to transport their cattle in mass.

The challenge is that when the normal traditional crossing points are submerged the interaction between the local communities will also be importantly declined especially for those areas such as the Hadiya community that depend predominantly on a mixture of seasonal cropping and livestock production. These local communities will probably suffer most as they are semi-nomadic agro-pastoralists where the crossing points will be under water and that the establishment of buffer zone will intensify the problem of grazing land in the area.

It can be suggested that an intensive road network parallel to the river line has to be established to connect the people between the different zones all along the river bank and make marketing and other interactions more accessible. The problem observed is that these people have no access to modern transportation systems for economic and social interactions between the different ethnic groups situated along the Omo-Gibe River. The network has to be parallel to the river line to connect the multi-ethnic societies living along the river banks and modern access roads have to be established to connect the local societies with central and zonal towns.

Accounting that hydropower is part of modernization the people inhabiting along both sides of the river have to be part of the change. Decision makers must perceive the development imperatives of the Gibe III project from local and national perspectives. The characteristic features of most hydropower schemes that often transmit the hydroelectric energy into a urban and industrial centers leaving the local people marginalized has to be changed in a way that these people can benefit from their resources and be part of the change. While decision makers assume that Gibe III project will bring remarkable change in providing electric services, it can be suggested that that change must be demonstrated in the local area too. As I have observed in the study area, in Addisu Bodere PA, there are people who have never seen electric light before. Thus Gibe III must be an exemplary project to bring positive changes to the local communities by providing access to modern electric services, health and education facilities among others.

### 6.2.2 Gilel Gibe III and the Health issue

The perception and wariness of the local people that the Gibe III hydropower project can intensify the prevalence of malaria is consistent with the experiences that several other dams built in the country including the Gigel Gibe 1, Koka, and Finchaa hydropower projects have caused on the peoples of the respective project areas. Studies by Kibret et al (2009) at the Koka hydropower reservoir show that there were high malaria cases observed in communities close to the reservoir. Moreover, vectors created along the reservoir shoreline were found in the settlements close to the reservoir. These findings

confirm that reservoirs play a greater role in increasing malaria transmission and suggest that it is necessary to establish a coordinated malaria control strategies to reduce the breeding habitat for anopheles mosquitoes (Kibret et al 2009). While constructions of large-scale dams create a stress in terrestrial ecology, it creates conducive aquatic features as a larval habitats for a varieties of waterborne diseases. It can promote the population of vectors which can affect the human and livestock population living around the reservoir.

The Gilgel Gibe valley is generally an area prone to epidemic malaria infestations killing a number of people, especially children and women (see Ch. 3). As there will be a change in land-use land cover from terrestrial to aquatic ecology, the potential for marked outbreaks of malaria in the project area is high. The pockets of shoreline water that can be created by the reservoir can be favorable breeding ground for anopheles mosquitoes. The reservoir will potentially be a favorable breeding ground for waterborne diseases making the vicinity of the project less conducive to live in as the population in the area will be at risk of being infected by malaria. The issue was expressly of high concern among the local administration and the local people alike (EEPCO 2009). The respondents from the Addisu-Bodere PA have explained their concern that the project although important for the country, can intensify the prevalence of malaria. According to these interviewees, a number of people have already been infected and children have been dying even before the dam construction was proposed.

### 6.2.3 Displacement and the issue of compensation

One of the detrimental features of large-scale dam projects is the displacement of large number of local people who had strong attachment to their local environment. Millions of people in different parts of the world have been displaced due to large-scale hydropower development projects. In India for example, between the 1950s and 1990s, over 20 million people were displaced as a result of development projects (Gutman 1994). In the same period 30 million people were displaced by development projects in China of which 10 million were displaced by construction of dams (Gutman 1994). The establishments of many large hydropower projects in the world have been achieved at

enormous human costs displacing a large number of people from their local areas. In general, resettlement and issue of compensation probably has been the least satisfactory aspect of dam construction from the viewpoints of the local people (Scudder 1973).

Historically, In Ethiopia, the tradition of compensation and resettlement of people displaced by large development projects was decidedly not available and people were authoritatively enforced to leave the area once decision has been in place by central government. During the construction of the Koka and Finchaa hydropower projects in the 1970s the rural farmers were forcefully displaced from their areas without compensation.

However, the major goal of resettlement and compensation of project-affected and most often marginalized section of population should not be to repeat similar philosophy of lifestyles that they used to live for centuries. This has explicitly been a characteristic feature of traditional hydropower development projects. The economic orthodoxy of transporting electric energy to center of demand leaving the local people as usual can disgruntle the local people.

Around the Gibe III project area, as noted in chapter 3, the life style of the local community has been marginal and the general health coverage in the Gibe III area has been low and people have been dying of malaria and many other water-borne diseases. Arguably, the major purpose of resettling project-affected people has to be to make a difference in living conditions between the abject lifestyle they have been living in and the new resettlement program. In its real sense it has to be an area where these marginalized people have to show a qualitative change: a shift from illiteracy to reading and writing, a change in modern health services, an access to modern electric service, etc.

Two possible limitations can occur where proper resettlement and post-compensation measures are distanced. First, the people have not had a proper skill of financial management and they can misuse the cash received as compensation. And secondly, in the process of compensation, cash payments usually have a gender characteristic, as is practiced in the country's rural areas, that men have more position than women and

children. Therefore, lack of financial management skills lead to financial mismanagement and can ultimately increase rural unemployment as well as rural-urban flows of unskilled labor.

The vast areas on which the Gibe III hydropower project is taking place as explained by the experts in the project office is virtually uninhabited due to the topography and temperature of the area. But in reality be it directly or indirectly the vicinity of the area is used by a large number of populations attaining important part of their food and additional sources of income such as honey production, firewood and construction materials from the riverine vegetation.

The immediate and potential effect of the project on the composite of ethnicities living at the vicinity of the project can be immense. The people have repeatedly explained their concern about the effect of the project on their future livelihoods. People living in Zaro, Gocho, Chercha, Addisu Bodere, Shota Chawala, Afa Kisori, Zimawaruma, PAs, and those living at the upper location of the river in Soro and Omo Nada districts have explained their concern about the impact of the project to the consultant MiD-Day International.

In Table 6.1 the major issues raised by some members of the district, and some PA administration collected from secondary data is presented. To substantiate these claims, I asked some of the project-affected people in Addisu Bodere PA regarding complaints mentioned by the people living along the other side of the Gibe gorge. The major responses from the interviewees in Addisu Bodere PA are presented in Table 6.2. Their concern includes both environmental and socio-economic issues.

Table 6.3 presents a summary of the number of project-affected people in some of the districts at the project where the dam is under construction. It is important to note that this data is a fraction of the impacts summarized by the EEPCO's Environmental Monitoring Unit and using this information as accurate representing all the affected people can be misleading. For example, the people affected by the EEPCO camp site in Addisu Bodere PA are not included in the data and the table is used to uncover this inconsistency.

Table 6.2 Summary of views from the local people around Gilgel Gibe III hydropower project

| **Name of District/PA** | **Issues raised** |
|---|---|
| Soro district Admnistration | - The Hadiya herders will miss access to cross the river to Omonada district in search of seasonal grazing.<br>- Local markets between the people living on both sides of the river will be interrupted.<br>- Large number of people lives adjacent to the river and rear livestock, using the river bank as a grazing land and often they cross the river to Dawro zone, Yem and Omo Nada districts. This tradition will be interrupted as the water volume increases.<br>- Local trade during the weekly markets of Jajura in Soro district and Nada in the other side of the river will be interrupted.<br>- All the traditional crossing points traditionally used by the local people will be inaccessible affecting the social and economic interaction of the local people.<br>- Large number of wild life (lion, leopard, hyena, etc) can endanger the lives of the local people.<br>- The local people used the natural forest for house construction and as firewood. The increase in the volume of the river will submerge these resources. |

| | |
|---|---|
| Zaro PA (Kindo Koysha district) | - We can miss our farm lands and the benefits we receive from it.<br>- We will be displaced from our areas and houses.<br>- Although the project is important for us, we will lose our houses, farmlands and the permanent fruit trees and root crops that will be inherited to our children (road realignment).<br>- We will lose the grazing lands for our livestock as a result of the dam construction and the alternative road that will stretch through our households, garden.<br>- We will lose our strong social relationships and regular contacts, we need information about compensation before the road realignment work is underway (transparency? Insecurity?)<br>- We have to have adequate compensation, priority for job opportunity, schools for our children in adjacent areas.<br>- Root crops such as potatoes and sweet-potatoes and other traditional root crops have not been counted (peak period not considered?). |
| Gocho PA (Kindo Didaye district) | - The local community will lose the areas that have been a source of firewood and building materials and grazing land all along the riverbank will be lost.<br>- The people will miss the opportunity of harvesting honey traditionally from the forest area as a source of additional income to pay taxes and use during special occasions such as weddings and other ceremonies and we will be displaced from our household and farming areas which is a source of livelihood for our families |

Source: (EEPCO 2009) Summarized from discussions held with farmers and Local administrations of project-affected areas and MiD Intl.2009- Translated from Amharic

Table 6.3 summary of interviews with respondents from Addisu Bodere Peasant Association (PA) members

| | |
|---|---|
| Addiso Bodari PA (Loma district) | - That over 33 farmers missing their farm and grazing land due to the camping site construction have not been registered for compensation, many of them were not informed about the project<br>- The area was farmland and important grazing area used by the farmers around the vicinity<br>- The artificial lake will invade a large area of grazing land and wildlife habitat<br>- The area is prone to epidemic malaria and will be intensified after the dam is constructed.<br>- One of their member was in prison for about six hours labeling him as violent against the project<br>- That two of the farmers representing the 33 who allegedly missed the land appealed to the legal courts at zonal, regional and federal levels. Abandoned their cases due to economic problems.<br>- Have been paying land tax even if the land was taken for camping site construction.<br>- feel disappointed of the administrative and legal situations in the area<br>- missed trust upon the governance and they do have minimum expectation to get compensation for the future Chida-Sodo road realignment project.<br>-Positively, the project gives temporary employment, and we expect that we will benefit from transportation, tourism etc. |

Source: Responses from in-depth interview and focus group discussion with members of Addisu Bodere PA, October 2009

Table 6.4 project impact on household assets by Wereda and project component

| By wereda | No.of HH | Total land affected (ha) | No. Of houses affected | Perrenial crops & trees |
|---|---|---|---|---|
| Kindo didaye | 165 | 81.89 | 31 | 58,388 |
| Kindo Koysha | 69 | 25.56 | 2 | 613 |
| Loma | 121 | 81.49 | 14 | 12,851 |
| Total | 355 | 188.94 | 47 | 71,852 |
| By project component | | | | |
| Reservoir | 58 | 97.55 | 0 | 6523 |
| EEPCO camp | 47* | 22.95* | 29* | 51,748* |
| Chida-Sodo road realignment | 250 | 68.44 | 18 | 13,581 |
| total | 355 | 188.94 | 47 | 71,852 |

Source: Extracted from ESIA, EEPCO 2009

Note: Reservoir extends to 11 Weredas. The table shows part of the project impact.
*The area expropriated for EEPCO site camp from Addisu Bodere PA complained by 33 farmers is not included.

The number of people affected by the dam reservoir and the EEPCO camp site as mentioned in Table 6.4 above are 47. The project's Environmental and Social Impact Assessment (ESIA) documents also show that no single household and family was affected or displaced by the EEPCO campsite at Loma district.

The individual interviews and focus group discussion with members of Addisu Bodere PA disagree with the information obtained from EEPCO. Officials from EEPCO point that there was no member of the farming community displaced for camping site and reservoir construction. My discussion was focusing with those groups of people in Addisu Bodere PA who lost their farm areas as a result of camping site construction for the employees of EEPCO and the contractor Salini Consruttori. During individual interviews and group discussion in Adisu Bodere PA, the people complain that their farm areas that they inherited from their forefathers were expropriated by EEPCO to build camping sites. Two of them for example explained that the EEPCO and the contractor's camping site with an estimated area of five hectares each was their farm land that was taken without any compensation. They have been paying a land tax for a long period of time. During the interview one of the respondents presented a document appealed by 33 farmers to the zonal and federal courts stating that the camping site was taken from these people without compensation. While the local people along the project area explain their concern about the project on their livelihoods, the local environment and the social interactions, the environmental Monitoring Unit (EMU) of the project sates that:

*"There are no tribal people or ethnic minorities around the Gibe Dam and reservoir area whose traditional lifestyle could become compromised through the implementation of the proposed hydropower project. Therefore, no indigenous development plan will be required"* (2010: 6).

The claim by the EMU is contradicting with the views explained by the farmers as seen in Tables 6.2 and 6.3 as well as the effect of the project as presented in Tables 6.1 and 6.4. It overlooks the adverse impacts the project can potentially have on the

people in the area. Decision makers have to take into account that the lands and households the people will lose are areas that they have been dependent throughout their lives. Therefore compensation to the people should be inclusive to all members affected by the project. The issue must specifically be understood that, as shown in table 6.1, the reservoir will extend along 11 districts. Due to the long reservoir, the people who traditionally had strong economic, social and cultural interactions will be interrupted; the previous crossing bridge will be submerged. Moreover, the salty water ponds and special soil bed traditionally used for cattle fattening, loss of hot springs and holy waters, partial flooding of cultural sites of King Ejaojo Kella and King Halala walls are irreplaceable loses. As mentioned in Table 6.1, over 20,000 hectare of woodland area will be affected all along the 11 districts. This will cause over 50,000 hectares of woodland to lie within the proposed buffer zone. These unavoidable impacts and the resulting socio-economic and environmental problems could have an adverse effect on the people's psychology. Although the EEPCO's ESIA documents indicate that the two cultural sites will not be totally in water, the respondents explained their wariness that these sites will totally be inundated.

## 6.3 Response from local authorities

Major development sectors such as road construction, large-scale hydropower and other mega power resources are owned by the federal government. Therefore, financial matters such as compensation is mainly produced by the central government while some other issues such as relocation of project affected people is performed in association with the local administration and the project owner- EEPCO.

In a number of documents reviewed during the study, the most redundantly mentioned point on Gibe III pertains to the economic benefit of the project as a source of foreign exchange to the country. The connotation can generally undermine the local environmental and social dimensions while looking ambitiously to the economic dimensions of the project. The local people at the dam site strongly complain about the benefits that they should have to receive as direct victims of the project.

As explained by one respondent in Addisu Bodere PA, the wereda and zonal administrations has been performing their political assignments than reflecting the local people's social and economic problems.

*While we have lost our farm and grazing land here at Addisu Bodere PA and while we are the direct and immediate victims of the project, a school was built at the district town of Yalo-a long distance to send our children to school.*

The area is largely affected by lack of education and a number of school dropouts of young children due to lack of access foe education and economic problems to send them a long distance to other towns. The people affected directly by the project at the dam site have to be direct beneficiaries of the project.

The other important point to mention is the tribunal case related to the project-affected people in Addisu-Bodere PA. Over 33 people in Addisu Bodere PA were not registered for compensation. These farmers took their case to the Federal court claiming that they have lost farm and grazing land due to the project campsite. According to these farmers, they could not follow the case due to financial problems. One of them was imprisoned for six hours by the zonal administration. This is in fundamental disagreement with the civil rights of the people and their privileges to express their views, concerns and claims related to the effects of the project on their lives. '*How can we believe that this local administration(yalo), will stand in favor of us in the future if it could not hear our problem now*?', Was an interesting question that was asked by one of the respondents during the individual interview in Addisu Bodere PA. The perception of the local community as experienced from the respondents will be explored in the next section.

## 6.4 The perception of the local people on Gibe III project

The general understanding of the local people about the project was a blend of hopefulness and wariness. During the focus group discussion in Addisu Bodere PA the participants had a unanimous positive response when asked about the development of Gibe III hydropower project in the area with some basic stipulations:

*Thanks God and the government. We are happy that the Gibe III hydropower project is being constructed in our area as a source of electric light for the future. But we are skeptic that the authorities will solve our immediate and future problems. The area where the EEPCO and the Contractor's residence are built was our farm and grazing area. Our families' livelihoods depend on farming and livestock production. Part of our farm land is taken by the project without any compensation. We are worried about our future livelihoods.*

Their views reflect a combination of ideas that can be examined from different perspectives. From the respondent's perspectives one can point out how the local people in particular have explained their views by intertwining faith and politics. There is a general tradition in the country and more specifically among people in the project area that in the hierarchy of authority, 'next to God is the state'. This idea prompted the people to authentically believe that all regulations and plans coming from the state are enforceable. Such perception can be a challenge both to the government and the people. The political system has to do its level best to make the project-affected people understand the marked differences between their faith and the exercise of one's democratic right. On the other hand, the preoccupation of the local people with a perception of the state's righteous authority in all decisions of development projects will hinder them express themselves in the real sense of understanding the impacts of the project. Presumably, thankfulness to what one believes and to the state as well is not problematic in its real context. The problem however is the provision of righteous authority to the state and to believe the state as a creature of the Devine. This in turn may blur the community to understand and exercise their full rights to decide on what matters on their present and future lives. Provided that the local governance represents the people around the project area, a transparent and relentless action must demonstratively focus on creating awareness of the people's rights to empower themselves and decide on their future lives.

Another point reflected by these people is a sense of happiness and hope in the future on what the project can bring to the area. From the nearby camping sites, they have

already observed the differences between having light in the dark and to live the whole life in dark. This is one of the major positive contributions of the project camping sites. Observation is part of learning new technologies; a technology not previously seen in the area.

As I observed in the camping sites, although it is a temporary activity, many people sell their local commodities to the project employees. Farmers can curiously observe the facilities and services available in the camping sites. I observed that some of them have mobile phones and they use electricity from the camping sites to charge their phones. These camping sites can demonstrate the differences between modern and traditional ways of life.

The third point that can be derived from the farmer's perception is the skepticism on the commitment of the decision makers to solve the present and potential problems resulting from the project development. As mentioned earlier, these people are parts of the local people that were not given a compensation of any kind while they lost their farmland due to the camping site construction. But some of them are registered for compensation from the Chida-Sodo road realignment that will be effective in the future. I asked them probingly whether they expect proper compensation during the new road realignment project in the future. Their response was: "*how can we believe that we will get compensated while received nothing from the one which we already have lost?"*

The farmers' understandings imply that the present practice can make the future promise a rhetoric and hollow-hope. From the respondents explanation, it can be said that they have developed lose of trust on the local authorities. This in turn has a daunting psychological impact subjecting the people to get worried of their future livelihoods. It needs an integrated therapeutic effort by the local administration, the project owner and the involvement of concerned government institutions. As a representative of the local people in the project area, the local administration has to address the people's interest and present their concerns to the project owner and the

federal government instead of suppressing the people not to reflect their views and problems associated with the project impacts on their living conditions.

Why do some members pay a land tax for a piece of land that is expropriated for camping sites? If these members are paying a tax for the area where the EEPCO camp site is constructed, why did the local administration reject their appeal for compensation? These people contested the project thorough legal means claiming for compensation. Whether the project owner will consider their appeal in the future has yet to be resolved. At present, the main concern is centered on how to bridge a trust between the people as victims of the hydropower project and the governance who exercise its power therein. The previous registration for relocation of the local people and the compensation process should to be updated such that those people excluded from the compensation packages can be reassessed and be included as parts of the program.

# CH. 7. Conclusion

This section presents the conclusion of the study. The research has examined in detail the controversies that emerged among actors and the problems encountered during the planning and implementation of the Gilgel Gibe III hydropower project located in south-western Ethiopia.

The main discussion is based on Figure 2.1 mentioned in chapter 2 that depicts the actors and the main challenges on the hydropower scene. It is assumed that hydropower is a renewable, locally available, and economically viable source of energy. To exploit this resource, it requires high financial investment, competent institutional capacity, accommodative regulatory frameworks, and participation of pertinent stakeholders during planning and implementation of hydropower projects. The controversies characterising hydropower projects in developing countries can partly be lack of one or more of these factors.

As depicted in Figure 2.1, three categories of actors are included in the hydropower scene: the host country, the financial community, and the hydropower industry. Within the host country among others are the government agencies, and the project-affected people. The host country, or the project owner in the case of Gilgel Gibe III hydroelectric project, has the most important role to attract the remaining stakeholders into the optimal stage. The participation of the financial community such as the World Bank, AfDB, etc., and international organisations including the IHA, IEA, and NGOs depends on the policy of the particular country, the capacity and efficiency of the governmental agencies, the legal framework for planning process, and the level of participation of the local people impacted by the project. The implication of favourable policy environment attracting participation of respective stakeholders is that the controversies emanating from hydroelectric projects could be minimized while the level of participation increases. Conversely, when actor participation is compromised, the apparent controversies will be more intense affecting the project's

financial support from multinational organisations such as the WB, and delay in the project completion. This will cost the project more money than the initial estimation.

In general the discussion in this thesis is based on the underlying principles attached to hydropower development projects involving a number of actors and the apparent challenges existed in Gibe III hydropower project and how project development can be affected in the absence of a single or a set of actors from the scene. This was more specifically approached using the primary data sources to evaluate how the multispectral actors have been participating or in other words whether there has been a general framework that encourages the participation of actors in the project development process. Among the major participants in the project development process are the local people affected by the Gibe III hydropower project. The result of this study is based largely on the issues pertaining to the local people and local environment affected by the project development.

To accomplish the research, primary data was collected from the local people at the project site. Addisu Bodere Peasant Association (PA) was the main site that was purposively selected and 8 people were selected from the community affected by the project for in-depth interview and another 10 people for a focus group discussion. The method of selection was purposeful sampling. The climate and topography of the project, the distance between the dam site and the upper part of the river, and the time limitations required the selection method be purposive sampling where respondents from those groups facing immediate impacts from the project were chosen. If I had selected respondents randomly and by chance had picked the people at the upper part of the river, for example the Hadiya herders, the sample would have been unrepresentative as the most affected groups along the river at present consists of the people living in the proximity of the dam site. The issues raised by the people in the upper part of the project are derived from secondary data sources.

As shown in Figure 2.1, it has been established that hydropower development projects are complex processes that often encounter a number of challenges, which in turn demand that such projects have a participatory planning and implementation process.

An issue given less consideration during the planning process can manifest itself as an impediment when decision makers later implement the project on the ground.

The major issue of controversy surrounding Gibe III hydropower project was the procedures that the project owner followed to conduct environmental and social impact assessments (ESIA). Opponents that criticize the project argue that the project's ESIA was conducted after the project construction was begun in 2006. Moreover, the construction contract was given to Salini Construttori without competitive bidding which is procedurally inconsistent with the principles of large-scale dam construction set in the national and international regulations. World Banks regulation abides borrowing countries to procure contractors through International Competitive Bidding (ICB) to get fund for large-scale development projects (WB, 1995). The strong criticism and opposition of the Gibe III dam focused on cases of financial support to the project by international financing agencies including the WB, the EIB, and the AfDB. International environmental organizations strongly opposed the project and financial support promised by AfDB and EIB was halted. Had the project owner, EEPCO, brought governmental agencies, the affected people, and NGOs participate in the project development, there would have been a sound investment climate, an equitable decision process for impact management allowing for creation of sustainable financing mechanisms. And integration of the stakeholders would have led to the implementation of the project as planned.

On the other hand mismatch of interest, ideas, and perceptions would lead to more controversies around the project. The controversies surrounding the Gibe III project are partly the results of how the stakeholders perceive the project. The project owners sees Gibe III project from development imperatives and argue that the electric energy produced from this large-scale project is renewable; locally available that will contribute to the economic and social development of the country. Opponents of the project on the other hand contend that this project is environmentally destructive and can cause social violence as the livelihoods of the downstream population will be affected. And thus this project has to be stopped. One of these mechanisms to stop the

project construction according to these groups is halting financial support from international financiers such as the WB, EIB and AfDB. In line to this, it can be said that these groups were partly successful and partly not. Partly succeeded because their appeal against the project financing was considered by big financiers including the World Bank, African Development Bank, and the European Investment Bank and application for fund from the project owner was rejected. But the construction continues albeit these measures. Therefore, if the aim of the international NGOs was to stop the project and the consequent social and environmental impacts by stopping financial support from big financiers, this may intensify the social and environmental impacts as long as the project is not stopped in its totality. My point here is that the more the project is delayed due to financial constraints the more will be its economic, environmental and social costs. According to responses from EEPCO's experts, and as experiences from other large dams such as Bujagali of Uganda (Linaweaver 2002) and Bui of Ghana (Alhassan 2009) shows, politicians in these countries view some environmental NGOs as subversive actors against the development of African countries.

The other and most important issue discussed in this thesis is on the level of participation of the local communities around Gibe III hydroelectric dam. Although the principles of hydropower development projects as set by the international organizations and the host country itself demand the participation of local people in issues that matters on their lives, the planning of Ethiopia's Gilgel Gibe III hydropower project was criticized of violating these codes of conduct. The respondent from EEPCO stated that the environmental and social impact assessment (ESIA) study was conducted in a transparent manner and consultations were held at all levels with the people affected by the project. The respondents in Addisu Bodere Peasant Association (PA) did not share EEPCO's idea. They ascertained that there were discussions with the PA administration and some members of the PA about the Chida-Sodo road realignment but not about the project impact in general. They described that they had no information about the project and no consultation was conducted. For example, the campsite for EEPCO's field office was expropriated without consultation with the farmers in the area. The project office stated that the area was an open space

and there were no people displaced for campsite construction. But as I observed from the letters exchanged between the farmers and the Zonal and Federal courts, 33 farmers complained that they were displaced without compensation. Therefore, one cannot conclude that the planning process was transparent and inclusive to all members of the communities affected by the project.

When asked what would happen to the local environment and livelihoods of the community living along the river banks that will be impounded by artificial lake of the project, the respondents stated that social and economic relationship between communities inhabiting on both side of the river would be interrupted, and the type and quality of riverine vegetation and other resources would decline. Moreover, the people in Hadiya zone described that their lives will be endangered by wildlife such as lion whose natural food-chain system will be interrupted (EEPCO 2009). Even before the project, the people in this part of Gibe river have been attacked by lions very often.

The biodiversity along the vicinity of the river basin which will be inundated by reservoir is one of the major problems mentioned by the people around the project area. The local biodiversity is highly affected as the artificial lake will impound a large portion of the natural habitat for wildlife. There will be a marked change of terrestrial landscape into aquatic feature as the reservoir will occupy a large portion of land that has been a habitat for wildlife. This intensifies a resource conflict between wildlife within the remaining habitat. Moreover, disturbance of the prevailing food-chain due to the project would cause extinction or migration of wildlife. Establishment of buffer zone designed as mitigation measure to protect the natural habitat could not be a sustainable solution unless alternative measures to substitute the farmer's benefits that have been exploited from the local environment are devised. The people in the area get construction materials, firewood and traditional honey from the reverine vegetation. It is an important rangeland for their livestock. Demarcation of buffer zone should take these public concerns into account and should design a sustainable alternative measures to benefit the local people.

The other important problem is the issue of relocation and compensation. When EEPCO plan to construct the Gibe III hydropower project, it has moral as well as legal

obligation to produce compensation in cash, or in kind or both based on the type of damage the project has incurred on the people's own source of livelihood, houses etc. Compensation, in part, implies giving monetary support to an individual or family for what has been lost due to the development of the project. It is assumed that the compensated amount will in part support the people for their remaining lifetime. In my opinion, the purpose of compensation has to be to provide a better life for the evacuees than before. When compensation is paid to farmers affected by the project, the main target of decision makers should not be based on take and leave principle.

In the Gibe III project, as mentioned by the respondents, some have received a limited amount of money while others such as those displaced construction camping site have not yet been registered for compensation. There is an irregularity in the compensation process and this issue has created mistrust between the project affected people, the project owner and the local administration. The local administration has been perceived as a supporter of the project disfavouring the local people.

One of the major issues that came to light during research in Gibe III hydropower project is the potential post compensation management problem. Compensation is given to parts of the community which do not have any knowledge about how to utilise the money. There is no institution that can assist the people in the area with regard to this. Thus my conclusion is that where there is no responsible institution to handle the post-compensation management plan, misuse of the cash will lead to rural unemployment and ultimately to a rural-urban flow of unskilled labourers. Therefore, compensation for the people affected by the Gibe III project without sustainable management plan to lead the people into a better life is not sustainable solution and has its own drawbacks.

The people's perceptions of the project vary according to the effect the artificial lake has on the farmer's livelihoods. The information gathered from the respondents in Addisu Bodere indicated that the people support the project provided that the basic issues of compensation are fulfilled. The project is seen as a source of temporary employment, a market with better prices for some local products such as chicken and

eggs, and a sort of exhibition of modern urban life with electrification and its benefits as the centrepiece. Nevertheless, these benefits would be much more convincing could the project owner handle the problems of compensation fairly.

In Soro wereda of the Hadiya zone, where semi-pastoralist tribes live, the people have regular socio-economic relationships with the people of Omo-Nada wereda by crossing the river at certain crossing points. Moreover, they use the other side of the river as a seasonal grazing area for their livestock. The project will obstruct these relationships which have been practiced for many years. Although there are positive measure planed to mitigate the problem, for example using small boats to transport the people, it is unlikely that these boats carry a mass of livestock for seasonal grazing on the other side of the river. In addition to introducing small boats to cross the reservoir, it would also be important to establish a transport network laterally along the river and radially towards the small towns to interconnect the communities along each side of the reservoir.

In general, from the development imperative the Gibe III hydroelectric project is perceived as one of the renewable electric energy resources that will increase the country's electric generating capacity by half upon its full operation, and thus will play a key role for the social and economic development of the country. From the environmental NGOs perspective, the project is perceived as one of the destructive projects disrupting the local environment and ethnicities living in the area. From the local peoples perspective, Gibe III is perceived with a blend of hopefulness and fear. They are hopeful because they expect that the project will supply them electric light, introduce modern transport infrastructure, and get a fair market price for their farm products. They are suspicious of the project because the reservoir will interrupt the prevailing socio-economic and cultural relations between people inhabiting on both sides of the river, and the project owner, EEPCO, was unable to conduct an overall social impact assessment of communities affected by the project and failed to consider the compensation for some members of the community. This can be one of the main causes of controversies of large-scale hydropower projects. The project owner has to be transparent and inclusive in planning and decision making to accommodate all the stakeholders and particularly those affected by the project.

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# Appendix I

## The Challenges of Renewable Energy Resource Development: The Case of Gilgel Gibe III Hydropower development Project in Ethiopia

**Interview Guide**

**Respondents:**

1. Ethiopian Electric Power Corporation (EEPCO) project office and project site

2. Environmental Protection Authority (EPA)

3. The local people- Addisu Bodere PA

**I- A set of questions on the policy issues:** Ethiopian Electric Power Corporation (EEPCO)

1. Among the renewable energy resources Ethiopia's energy policy prioritizes to develop large-scale hydropower energy. What are the main reasons for that?

2. Have you conducted a detailed impact assessment before the construction phase of the GGIII hydropower project?

2.1. If yes, what main elements did the evaluation team take into account during the process of impact assessment?

3. The planning and decision making process of the Gibe III dam construction is a multi-spectral issue involving a number of actors at local, national and international levels. Was your policy open to invite those actors?

2.1. If yes, who were those actors? And are their views included in the decision making process?

4. The Omo-Gibe river flows to Lake Turkana of Kenya. Was there any reaction against the project from the Kenyan side? If yes, what solutions did your institute suggest to solve the problem?

5. The Gilgel Gibe III hydropower project covers a large geographical area: as long as 152 km, and a width of 600 meters and an area of 211km$^2$. How does the policy treat the environmental impacts of the area- on vegetation and wild life?

6. Was there a permanent settlement all along the 152 km river banks?

-Number of people at the project site_____

6.1. Have these local people been displaced from their area?

6.2. Can you explain their reaction for or against the project construction?

7. Among the local people, there could be some hopes and expectations from the hydropower development project: economic and social. What is your plan to entertain those expectations?

8. Can you mention some of the main challenges you encountered during the process of planning?

8.1. How do you explain the cultural setups of the local people in relation to the changes that you intend to introduce around these areas?

9 .The local people around and below the project area have been living there for centuries with their own ways of life and cultural values. And there can be important cultural sites within these areas. How does the project development strategy entertain these challenges?

10. Your contact with the local people at and below the dam site: Have your office had a regular meeting to inform about the dam construction at Gibe River?

10.1 If yes how often? And through what channel?

10.2 What was the response of the local people? Did you have similar or different responses from the people around the dam and the people at the upper location of the project?

10.2.1 The local people at the dam-site

10.2.2. The local people at the upper part of the river.

11. The local people around the Gibe valley have been extremely marginalized during the previous regimes. Are their voices hearable nowadays? Are they empowered to make decisions that matters to their lives? Explain.

12. The local people at the lower part of the river are very tribal and culture bounded. What challenges did you encounter while you approach them to inform about the project?

13. Are there institutional setups established or planned to help the local people, for example, water, electricity, education, health, transport facilities?

14. What are the main sources of livelihood of the local people? And how do you plan to mitigate the issues of future livelihoods for the people residing along the project site?

15. Financing big dams is very expensive for developing countries like Ethiopia. Have you secured the financial resources to complete the GGIII hydro-project? If so who financed the project?

15.1. Is it sufficient to complete the project construction within the planned time frame?

15.2. If not what is the government plan to finance the project in order to complete it according to schedule?

16. Let me ask you about the market situation of electric energy. There is a demand boom for energy in the country. Investment is increasing. Investment needs energy security. On the other hand you have planned to sell hydropower energy to neighboring countries, such as Kenya, Sudan and Djibouti. In your view, how is it possible to meet those demands at the same time?

17. Currently there is an energy crisis in the country. Over one percent of Ethiopia's GDP is declined due to energy shortages in 2008/2009. Electricity is rationed on shift/outage basis. What do you think is the cause of these energy shortages?

18. Institutional capacity: Is the EEPCO capable to run the energy sector efficiently (production, distribution and consumption)? If yes how? If not what is your plan to overcome the challenge?

19. One of your short term plans is to supply electric services to large areas of the rural Ethiopia by the end of the MDG (2015). Do you think that the country can meet those objectives within the time frame? If yes, explain.

19. There is seasonal variation in the amount of rainfall in the country. So, how sustainable is the water-dependent energy/hydropower sector of Ethiopia?

20. Does the EEPCO have a short term plan to electrify the local people along the project area?

20.1. How aware are these people on the access and sustainable utilization of the electric supply?

20.2. Do they claim access to energy supply as a basic human need?

21. At the North-West of the Gilgel Gibe III hydropower project, there are Gilgel Gibe I and II hydropower projects. Can you explain if there are any learned experiences that have been considered in the planning process of Gibe III project?

**II. Environmental Protection and Development Authority**

1. Did you participate in the feasibility study of the Gilgel Gibe III hydropower project?

1.1 If so, what was your professional role in the feasibility study of the GGIII hydropower project?

2. Did you conduct monitoring and evaluation of the social and environmental impact assessment of the project?

3. Do you have regular relationships with the project owner (EEPCO) to follow the environmental impacts of the project?

4. How inclusive and transparent was the planning and implementation process of the project?

5. How do you explain the richness of the Gilgel Gibe III hydropower project area in terms of biodiversity?

6. Do you think that these natural resources will be sustainable after the construction of the hydropower project? If yes, how?

7. Omo-Gibe river flows to Lake Turkana- a lake shared by both Ethiopia and Kenya. This means that the studies need to include international stakeholders. How participatory was it?

8. What do you think are the positive and negative impacts of the hydropower project on the biodiversity of the area?

8.1. The community along the riverbank uses the natural resources as additional sources of income. Do you think that this man-nature relationship could continue sustainably after completion of the project?

9. From the Kenyan side there are environmental groups called "The Friends of Lake Turkana" who strongly oppose the construction of the hydropower dam. Their concern is that the unique wild-life within the lake will be declined or disappeared, and that the tribes along the river will lose their livelihoods. How do the experts from the Ethiopian side understand these concerns?

10. Do you have an access to private and public mass-media to explain your view on the hydropower project and its impact on biodiversity and sustainable environment?

11. Has your office discussed with the local people to explain your views on the dam construction and its impacts on biodiversity?

11.1. If yes, what was the response of the local people?

**III- The local people – Addisu Bodere Peasant Association (PA)**

1. Did you or your representatives from your community participate in any formal discussion about the government's plan to construct the GGIII hydropower project?

1.1 If not, how did you get the first information about the plan to construct a hydropower dam at the Gibe river?

-By the government and local authorities- explain

-By the NGOs, and external experts- explain

1.2. How did you understand the information that you received from each parties?

2. Are you displaced from your local area due to the project construction?

2.1 How do you feel while you were informed that you will leave to another settlement area?

3. While you were informed about the construction and the purpose of the hydropower project, did you perceive the program positively or negatively? Why?

4. Have you raised some issues that should be considered by decision makers in the project proposal? For example, compensation, future benefits you expect from the hydropower development, infrastructural facilities?

5. Did you get compensation? In kind, for example farm-land, livestock, housing, etc. or in cash? Farm size per HH----------? Amount of money per head----------.

6. Are you satisfied with the amount of compensation you have secured? If not explain.

6.1. Did you receive any training on how to use the compensation you received from the government? Mention.

7. Do you expect a future benefit from the hydropower development? Are you informed about that from authorities? If yes, explain.

8. Is there any infrastructure facility established in response to the project development in your area?

-education
- Health facilities
- Clean water supply
- transport services
-electric supply

9. Did you or anyone else from your community participate in the decision-making process? Were your views heard?

10. In your local area are there important cultural sites? e.g. ritual areas, cemeteries, etc.

10.1 If yes, how do you value these cultural sites?

10.2 Was there any damage occurred due to the project construction? E.g. road, temporary camps.

10.3 If yes, what was your community's reaction?

10.4. Have you or your colleagues suggested possible solutions for such problems? If yes what were your suggestions? Were they considered?

11. Prior to the construction of the Gilgel Gibe III hydropower project there have been regular communications and local market activities between the peoples of Wolayta and Dawro zones and the districts (Weredas). Do you think that this communication will continue? If yes how? And If not, why not?

12. In the near future what do you expect from the hydropower dam project? For example, economic benefits such as fish farming and tourism. Are you informed that you will participate in these economic activities?

13. In the North-West of the Gilgel Gibe III hydropower project, there are Gilgel Gibe I and II hydropower stations. A number of local people were displaced from these

areas. Did they share you their experiences about the impacts of the project development?

-About the facilities available (education, clean water, transportation, health, etc.), and prevalence of water- borne diseases after construction of the dam.

-Compensation- land and financial, and their life situations after compensation

14. What is your view on the hydropower project as a source of employment for people from your village?

14.1. From your community, how many people did get job opportunity in the project construction?

15. Can you explain your feelings about the construction of the hydropower project in your area? Do you feel secured or……..? Do you expect a change in your livelihood and your lifestyle upon the completion of the project? Explain.

**Thank you for your cooperation**

**Focus Group Discussion**

1. How does the project affect your economic and social relations?
2. Have you been displaced from your houses, farmland? Did you get compensation?
3. Can you explain your relationships with the project owner and the local administration?
4. Do you oppose or support the project construction in your area? Why?

**Thank you for your cooperation**